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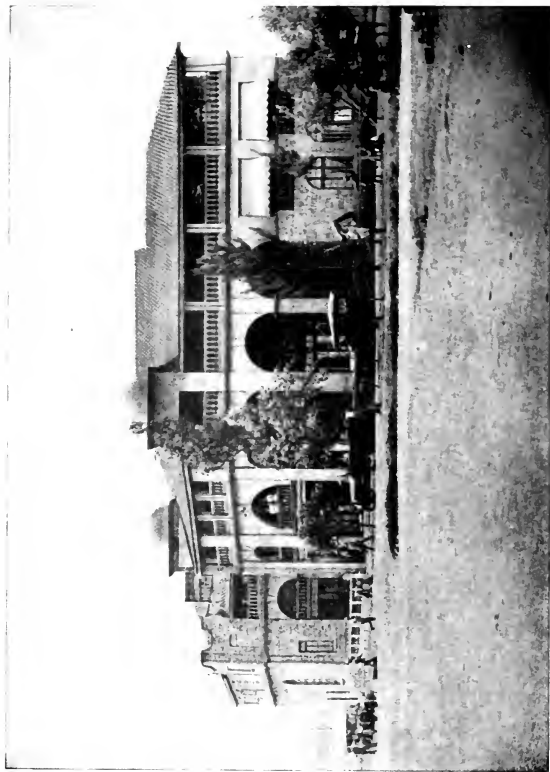
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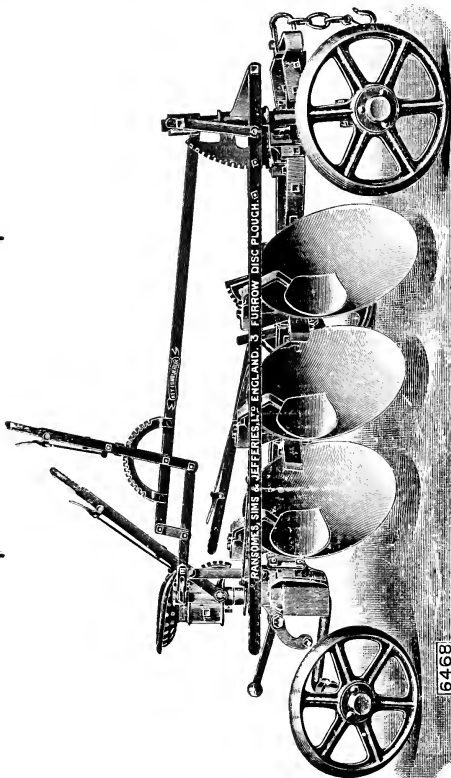
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IN  
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*A DESCRIPTION OF THE LEADING  
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AND PROSPECTS.*

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COMPILED AND EDITED

BY

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## P R E F A C E .

“**F**ARMING AND PLANTING IN B.E.A.” represents the only attempt that has yet been made to deal in book form, and in any detail, with agricultural conditions, methods and prospects in British East Africa. This fact, in itself, should be sufficient excuse for many shortcomings.

To initiate a work of this kind is difficult, and the war has greatly increased the difficulty. With a very high percentage of settlers away on active service, the scope of our book has been restricted and its measure of usefulness correspondingly curtailed.

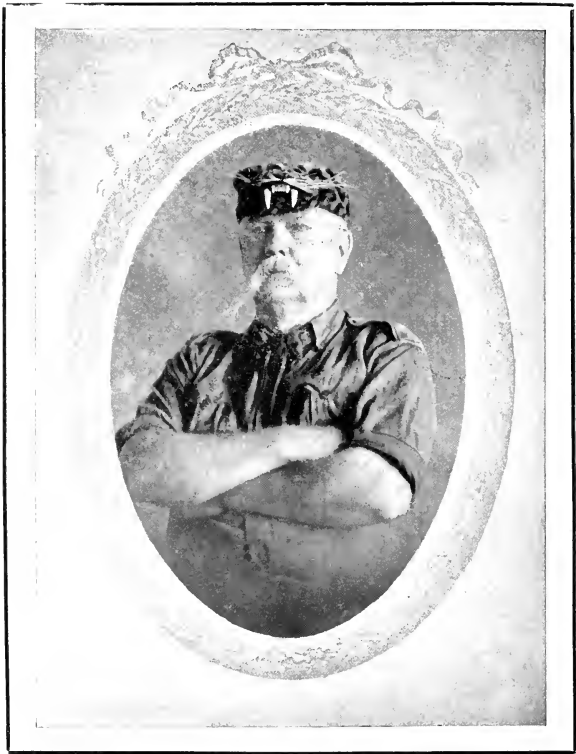
But, such as it is, we offer it as a conscientious endeavour to furnish reliable information to a discerning and rapidly increasing public interested in this country.

Without exception, every article has been compiled by residents of wide local experience, who have proven their ability to “make good” in the subject or business of which they have written. For this reason alone we place “Farming and Planting in B.E.A.” before our readers with a firm belief that it will repay careful study.

Our grateful thanks are tendered to all who have so kindly assisted. To the authors of the different articles that appear over their names; to the Right Hon’ble Lord Delamere for the use of photographs of his estates, etc.; to the Hon. the Director of Agriculture and the officials of his Department for valuable assistance and statistics; to Lieut.-Colonel R. J. Sturdy, D.S.O., for the use of photographs; to Mr. W. D. Young of the Swift Press for the extreme care bestowed upon the letterpress and illustrations; and to the Editor, Mr. T. J. O’Shea, but for whose unflagging interest publication under present circumstances would have been impossible.

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*W. Bowler*



## FOREWORD.

TURI, B.E.A.

February, 1917

DEAR LESLIE,

You ask me to write a "foreword" to your book on farming and planting in B.E.A.

Much water and some ink has flowed under the bridges since Newland first called across the Continent to me to come and take a hand in the sowing; and yet there is but half a generation linking then and now.

I can see the scene of our arrival sharp outlined in the sunlight and near as though it were but yesterday. The tucked up little train of that time crawling across the Plains and still an object of wonder to the swarming game—the tardy arrival at the great Metropolis of Tomorrow, NAIROBI, then the home of frogs innumerable and Tommy Wood—the Station too, do you remember it? A mud patch distinguishable only from the enveloping mudlands by virtue of the decrepit tin shed proudly holding aloft a kitchen clock! All the world was there, true to the old time Nairobi tradition, to meet the train. "All the world" was then four strong and—Newland, as ever radiating optimism.

Jolly times they were: eggs one hundred for a rupee (payable by chit); land for the asking, if you could only find it; bureaucracy as yet merely stirred to a mild curiosity; the great mind of Sir Charles Elliot willing the new era; and the great soul of dear old Bowker coaxing into being the advance guard of our future hosts. Then and thenceforward in all the varied doings and happenings which have made to-day, your firm has played an intimate and constructive part.

To-day our dreams of yesterday are already substantive fact entrenched in the redoubt of Trade Returns.

Our foot, a bit crushed perhaps, is in the door. But the call and glamour of Our Land is shouting and singing down the highways and byways of the world, and you, as I, can sense the gathering of the hosts, the banking tide that tomorrow swilling will fill this new tideway of Empire to the brim, and cast on the far shores of the Congo Forest and the hills of Abyssinia as wrack today's doubts, hesitations, jealousies and timid remonstrances, invariable human prelude to great human happenings.

Verily the old order changeth and in that near tomorrow when Kilindini, place of deep waters, is churned with the comings and goings of mighty fleets—when the Lake swarms with the freighting of incalculable treasure—when Nairobi has drowned its frog-chorus in the hum and rattle of the street car—when the Kikuyu "toiler" no longer expends his energy in song—when the official has matured into a civil servant with the elementary civic right of owning land—and the term "settler" has no local meaning, and all alike claim proudly to be folk of B.E.A.—when the inevitable has happened and yet another miracle has become a commonplace in the history of our Imperial Past—may be Mr. Smith and the Misses and the Masters Smith will take their packet of sandwiches and their bottles of gingerbeer to the top of Mount Margaret, and sitting on a cairn of rocks will look down over the grim scarred face of Longonot. They will be discussing the vast eternities of the Southern Rift and across at Mrs. Jones' drawing room, how Tommy is growing out of his trousers, and will be nervous lest they miss the last motor 'bus to town—and the winds of Suswa will be whispering, and if you or I were there we should note a something about Mr. Smith—an added something by virtue of which Mr. Smith is no longer mere Mr. Smith. Bothersome things, Leslie, these winds of the wilderness that call to our people with the voice of all Time and can wake even in the seeming urban stereotypy of Mr. Smith the same primaeval race promptings that stirred old Bowker, now sleeping for ever below his cairn of stones. They tell the Tale of Empire, do these winds; wild calling to wild, and the urge and surge of blood which must carry our people willy nilly into the last attainable confines of a finite earth, there to persist, absorb, dictate, boss and impose our Will.

Here is no insolence, but the essential Must of things—just "old Bowker sleeping the long sleep on Mount Margaret so that he may be near the drifting herds of game."

God rest him, fitting symbol of B.E.A.'s first phase.

What luck is ours to have seen the birth of a new Dominion, under such circumstances and in the midst of such surroundings—motor cars and lions, steam-ploughs and eland, sisal decorticators and rhinos, flax factories and elephants, cow punchers and sanitary experts—was there ever before such a fascinating interweaving of the pleiocene and the futurist!

Where else shall the halt and the lame, the war-inspired and all the restless aftermath of Armageddon find such a home as B.E.A.? The ice-slopes of Kenia and the hell-scarps of Rudolph, cocoanuts and edelweiss are the limits of our range

B.E.A. is the Wild a' calling to every wild British man calling in the note that is specially attuned to each.

So here's luck to your book, and a welcome from B.E.A. to every responsive soul it reaches.

Yours,

EWART S. GROGAN.

To

LESLIE J. TARLTON, Esq.,

NAIROBI.

## INTRODUCTION.

### THEN AND NOW

A decade ago British East Africa and Uganda were known only as immense fields for exploration, sport and missionary enterprise. Today, while still offering unlimited scope for the sportsman and the missionary, British East Africa stands out pre-eminently as a field for European colonisation.

### EAST AFRICA'S ATTRACTIONS.

Possessed of immense agricultural resources, soil of unsurpassed fertility, abundant water, regular rainfall, magnificent grazing, and an equable climate, it makes strong appeal to the enterprising Britisher seeking a new home.

### TRANSFORMATION

Where once were teeming herds of game and idle natives, are now smiling homesteads with flourishing areas of coffee, flax, wheat and maize; herds of pure-bred cattle and flocks of merino sheep. The erstwhile savage, stimulated by precept and example, has renounced the spear and shield in favour of the mattock and plough, and works in peace and contentment upon his own plantation or under European supervision in garnering the rich harvests of the soil.

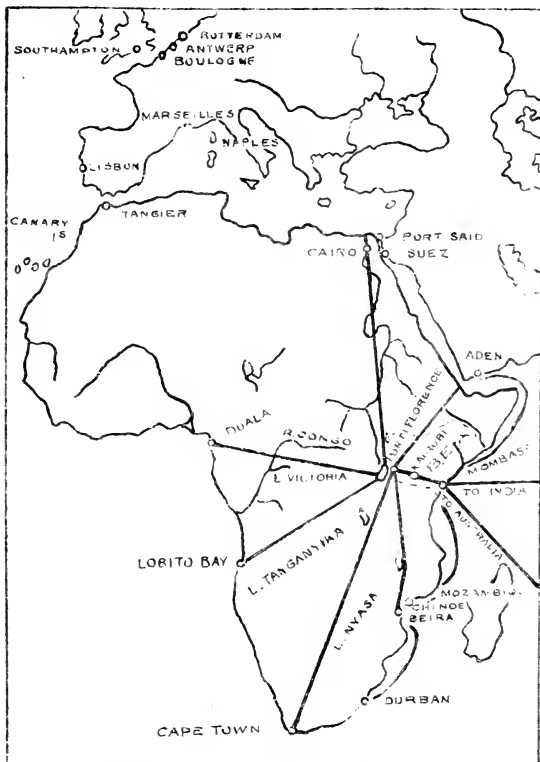
### THE HOME OF THE NATURE LOVER

A land of perpetual spring—of cool nights and bracing mornings, warm days and mild evenings—the East African Highlands boast of a climate which may be equalled, but cannot be surpassed. Their wealth of magnificent scenery—vast forests, smiling valleys and rolling plains—has attracted the nature lover in thousands, and with the unrivalled opportunities for sport, adds to the attractions of the settler's life.

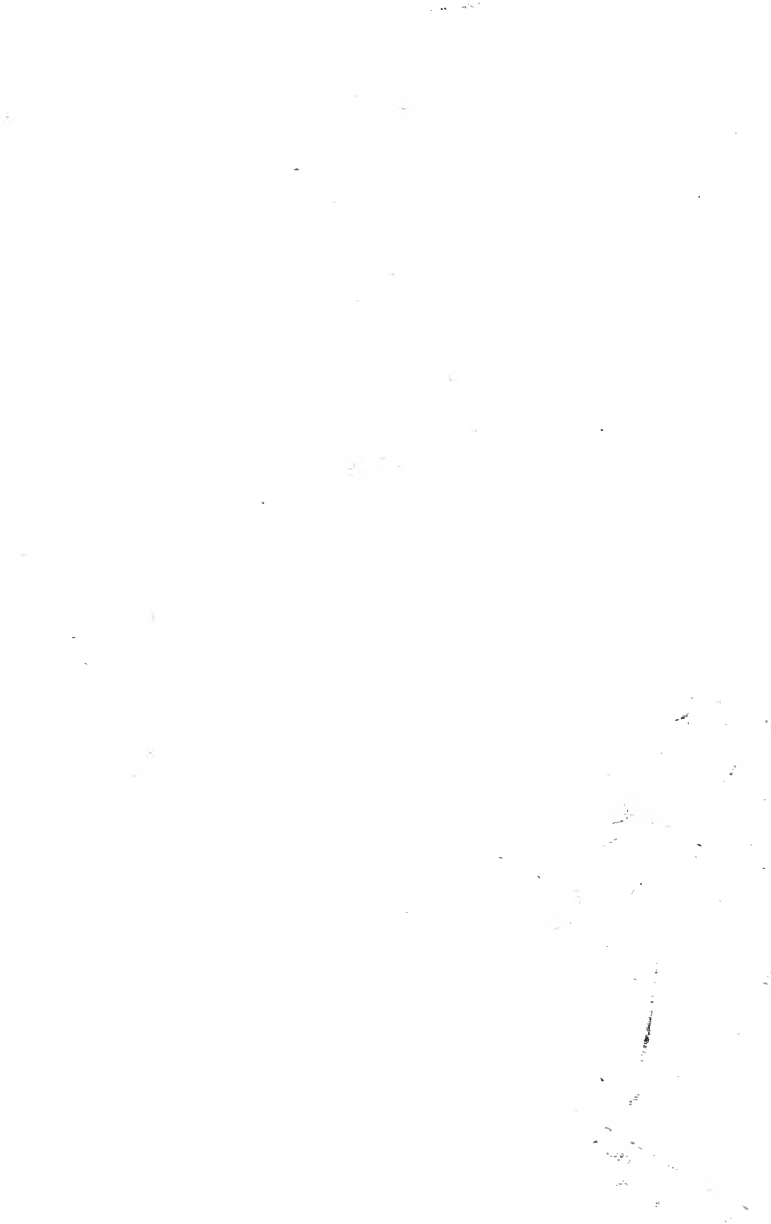
### EAST AFRICA'S STRATEGIC POSITION

The accompanying map indicates the position of the Protectorate, and students of the Empire's future are invited to note the strategical position. On the East a deep water harbour large enough to cope with the future shipping of a vast hinterland, connected by rail with the vast inland sea on the West—the Victoria Nyanza. The latter is roughly 250 miles across, linking not only the Cape to Cairo route, but forming the natural "Clapham

# FARMING & PLANTING IN B. E. A.



MAP SHEWING STRATEGICAL POSITION OF B. E. A.



**Junction” of the future trans-continental railway systems of Africa.**

For agricultural purposes, the British East Africa Protectorate is roughly divided into six zones—the Coast or Lowland, the Midland, the Upland, the Lake, and the Semi-Arid Zone. The last named includes a vast stretch of territory in the north occupied in parts only by pastoral native tribes, and unlikely to be touched for years to come by European colonists.

The Coast Zone comprises a belt of land 40 to 50 miles in width, running from Vanga about 5 degrees south to the Juba River just below the Equator. Climatically it may be considered to be purely tropical, with an average rainfall of 35 to 40 inches. Coconuts have in the past been the main industry, but of late years sisal, rubber, cotton, rice, maize, beans, sugar cane, etc., have been receiving increasing attention.

The Midland Zone represents a practically parallel belt of 130 to 150 miles in width lying westward. It includes two large stretches of rich land—the Tana Desert and the Seringetti Plains—which under a comprehensive scheme of irrigation could be made very valuable for the cultivation of sisal, rubber, maize and other crops.

The Upland Zone comprises an extensive open plain to the west of the Midland belt, at an altitude of 4,000 to 5,000 feet, with an irregular rainfall of 15 to 38 inches. Maize and beans are grown in certain areas, sisal plantations have been laid down and are now reaching the productive stage, but generally speaking this area is more adapted for stock raising than for agriculture, the short rich grasses offering excellent pasture.

The Highland Zone—the principal centre of attraction of European colonization—includes the rich districts of Nairobi, Kikuyu, Kyambu, Kenia, Naivasha, Nakuru, Lumbwa, Kericho, Kisii, Nyeri, and the Uasin Gishu. In the eastern half of this zone the soil is a rich chocolate loam, highly ferruginous; in the Rift Valley it is a lava ash; and from Mau

**CHARACTER-  
ISTICS OF THE  
HIGHLANDS.**

Range westwards a grey sandy loam exists, rich in humus. All three varieties are very fertile. *The climate is cool and healthy with an average minimum and maximum temperature of 50 and 70 degrees Fahrenheit respectively, and a certain average rainfall of about 40 inches.* The altitude of the occupied areas ranges from 5,000 feet at Nairobi to 9,000 feet at Londiani and the entrance of the Uasin Gishu plateau. The chief products are coffee, flax, maize, beans, wheat, barley, wattle bark, potatoes, citrus, sugar cane, deciduous fruits and sisal fibre. These are but the chief products—those considered the most profitable to grow—but it is claimed that practically anything that can be raised in temperate or sub-tropical climates, can be raised in the Highlands of B.E.A. Furthermore, cattle, sheep, horses, pigs and goats do excellently.

**THE LAKE  
DISTRICT.**

Beyond the western boundary of the Highland Zone the country suddenly drops in altitude to between four and five thousand feet, the climate being warm and humid, and the vegetation of a decidedly tropical nature. The soil of the greater part of this belt is what is known as Cotton soil, which, though not so easy to work as the chocolate loam of the Highlands, is capable of producing very heavy crops.

**WIDE RANGE  
OF SOILS.**

In at least two respects the Highlands of East Africa will bear comparison with any other part of the world—one is soil, the other rainfall. There is a great variety of soils, ranging from heavy black cotton to a light sandy loam. That most favoured for such exhausting crops as coffee is the immensely deep chocolate loam of the hill districts, representing the accumulated forest decay of ages. For such crops as wheat, oats and maize, the lighter loams are preferred. As an instance of the wonderful fertility of this class of soil the case is instanced of a field from which eleven crops of maize have been taken in eight years, and is still returning ten bags to the acre without manuring of any sort. Except in the case of black cotton soil, which though very rich is little used for agriculture because of the greater labour required to work it, the land is easy to cultivate and to maintain in good condition.

**RAINFALL.**

As will be seen from the returns appearing elsewhere in this volume, the rainfall is abundant, regular



and well distributed; the average annual fall for the Highlands as a whole being about 40 inches. There are two seasons, known as the "long and the short rains"—the first lasting from the beginning of April to the middle of June and the second from about the end of October until some time in December. Two crops per year are thus rendered possible—an advantage not enjoyed by many other parts of the world. In some parts of the country rain is recorded in varying quantities every month of the year, but over the greater part only occasional showers fall in between seasons, bright sunny days following one another in unbroken succession, thus favouring the ripening and reaping of crops.

The wealth of the natural pasture of the Highlands can scarcely be surpassed by any other country in the world. Both pink and white clover are indigenous, whilst a wild sanfoin is met with in parts. Tall Oat grass, Rhodes, couch and other creeping varieties help to make up a nourishing fodder for stock that keeps them fit all the year round, without additional feed of any kind. There are parts of the country where, it is claimed, a beast can be carried to the acre. This it would be difficult to prove, as no farm in the country is stocked up to anything like its full capacity; but it is undoubtedly true that men of wide experience of stock raising in South America, Australia and South Africa speak of the pastures of the East African Highlands as superior to any they have seen elsewhere.

GRASSES AND  
FODDER  
PLANTS.

The climate of the Highlands with which we are more particularly concerned—is admitted by all to be delightful. The days are pleasant, and although the mid-day sun is somewhat hot, its heat is clear and dry and far from enervating; men and women who have spent years in the country have found a warm summer's day in England more so. The heat is usually accompanied by a cool breeze, for, it must be remembered, we are within the tempering influences of snow-capped Kenya and Kilimanjaro. At the higher altitudes frost at night is frequent, while falls of snow are not unknown. The air is clear and bracing. Tennis, polo, football, cricket, golf and hockey are freely indulged in by lovers of out-door sports, practically the whole year round.

CLIMATE

## HEALTH

The death rate compares favourably with the average in England, and an analysis shows that the proportion of deaths due to purely tropical diseases is very small indeed. The birth rate is high, and children born and brought up in the country are healthy and well formed. That bugbear of countries traversed by the Equator—Malaria—is prevalent in tropical districts, but this is purely a question of altitude, and dwellers in the Highlands have nothing to fear. On the other hand, bronchitis, enteric, influenza, pneumonia and phthisis—as compared with Europe—are of very infrequent occurrence

## ADMINISTRATION

British East Africa is administered under the Colonial Office by a Governor assisted by an Executive and a Legislative Council which includes five non-official members at present nominated by the Governor. The principle of elective representative to the Council has already been approved by the Secretary of State for the Colonies, and a committee of the Council has been appointed "to elaborate the details necessarily precedent to the inception of that procedure," so that it should be a matter of only a short time when we shall have the Legislative Council a partly elected body. The Protectorate is divided into seven provinces, each under a Provincial Commissioner, and sub-divided into districts under District Commissioners. Anything in the nature of serious trouble with the native population in the European settled districts has been unknown for years. Their respect for the European's system of administering justice tempered by mercy has steadily increased, and undermined their faith in their own primitive methods of punishing the evil doer. In earlier days cattle thefts were not infrequent, but the practice of branding stock has made them increasingly difficult, and they are now comparatively rare

## EDUCATION

Government Schools for children of both sexes are established at Nairobi, Nakuru and the Uasin Gishu Plateau. The school in Nairobi can accommodate over 200 children, including about 80 boarders. The standard attained is the first-class College of Preceptors. In addition there are several private schools in Nairobi and other centres up-country. The rapidly increasing number of European children in the

Protectorate has severely strained the existing educational facilities, and concentrated attention on the necessity for extension and improvement. An increased grant for educational purposes was unanimously agreed to by the Legislative Council in its opening session this year, and from the attention being shewn in the education problems of the country by all sections of the community, it is to be expected that educational facilities will be greatly extended in the near future.

The native population of the Protectorate has been estimated at over 4,000,000, of which number the greater part is accounted for by the tribes from which labour is recruited. From this it will be apparent that there is no question of the labour being present in the country—the problem is one of having it available when and where required, and of education. The natives being mostly confined in reserves, organisation is necessary to regulate the flow to those districts far removed from native locations (in their vicinity little or no difficulty being experienced in obtaining all the labour required) and legislation is under consideration to deal with this problem. The East African native is adaptable and quick to learn if given an incentive to do so. Certain tribes, as for instance the Masai, prefer to work only in connection with stock, their services as herds being much in demand. Others, like the Kavirondo from the Lake district, shew themselves highly adaptable in learning the use of modern agricultural implements, while the Wakamba, not specially favoured for ordinary agricultural work, display marked intelligence in certain directions, particularly in dealing with machinery. Most of the skilled labour is done by Indian artisans, of whom there are large numbers in the country, but there is a steady flow into the Protectorate of natives of Uganda trained by the industrial mission there, and the local missions are teaching trades to the more intelligent of the natives who come to them for instruction.

The discerning reader of this book will note that, while many branches of agriculture and livestock are established on sound commercial lines, ensuring a handsome return on invested capital, others are still the subject of experiment, or only emerging from the experimental stage.

Inasmuch as European colonization of the Highlands to any serious degree only commenced some fifteen years ago, the flourishing condition of the settlement as a whole is conclusive evidence as to the intrinsic value of British East Africa. Books on local agriculture written only five years before this publication are couched almost entirely in the future tense. In the two succeeding paragraphs an attempt has been made to compare the conditions which then prevailed with those of to-day.

DIFFICULTIES  
OF THE  
EARLY  
PIONEERS.

*THEN*, the newcomer had to depend entirely upon his own resources, knowledge and initiative. Experience gained in other countries often resulted in his undoing, and no information was available to assist in the selection of land and implements, or in what and when to plant. In East Africa the seasons, rainfall, soil, and climate vary with the altitude, and it was found that the prudent course in one locality was the height of folly in another! Coffee, succeeding to perfection at 5,000 feet, failed on precisely similar soil at higher altitudes. Sheep in one district thrived, but perished in another, owing to some alteration in the climate or feed. It was only after years of bitter experience, many failures, and an expenditure of much capital and energy, that the strong hearts won through, and by their efforts cleared the way to Prosperity.

THE OUTLOOK  
TO-DAY.

*NOW*, the new arrival, benefitting by the experience of these early pioneers, may direct his energies along lines of proven success, and reap the advantage of these costly experiments. But although land is cheap to-day, its phenomenal richness, combined with the fact that the country is limited in area, indicate a rapid rise in values immediately after the war.

THE EDITOR.

NAIROBI,

October, 1917.





*Photo by W. D. Young.*

**AN EARLY IMPORTATION BY LORD DELAMERE.**

## CATTLE BREEDING.

NO one who has had any experience of the colony will for a moment deny that British East Africa possesses most of the essentials to render it an ideal stock country. The climate of the Highlands is so equable that the housing of cattle is quite unnecessary at any time of the year, although during the rains cows kept for milk production thrive and yield better results when given some protection at night. The wealth of the natural pasture throughout the uplands can scarcely be surpassed by any country in the world.

B.E.A. AN  
IDEAL STOCK  
COUNTRY.

Even during the dry seasons cattle thrive and keep fat upon the natural grasses without the aid of any artificial feeding. Both pink and white clover are indigenous plants, and in many districts thickly cover the ground, whilst a wild sainfoin is met with on the Athi Plains and elsewhere.

NATIVE  
GRASSES AND  
CLOVER.

In Argentina and many other great cattle countries artificial grass, paspalum and lucerne have had to be planted before the land would carry any considerable quantity of stock; yet there are districts in this country which are said to keep a beast per acre fat all the year round. Even the richest Leicestershire pasture cannot claim to do this.

By no means the least important attraction of British East Africa as a cattle country is the abundance and excellence of the native stock. From the coast up to Victoria Nyanza are to be found vast herds of animals, suitable for grading, in possession of the natives, and although their price is steadily increasing, good cows may be bought at figures well within their value. At first sight the native cow will probably disappoint the new comer; her small size no less than her humped shoulder, drooping quarter and varied colour being alike typical of the zebu tribe to which she belongs; but she is hardy and thrifty, and mated with a pure bull produces offspring which partake of most of the good qualities of their sire whilst losing the character of the dam. Pastoral tribes such as the Wakamba, Masai, Nandi, Turkhana and Lumbwa have bred cattle generation after generation, with the result that it is no uncommon thing to find

CATTLE OF THE  
COUNTRY.

fully one thousand head in the possession of a single individual. These tribes are, as a rule, unwilling to sell their cattle at the present time, but as their ever growing need for the commodities of civilisation increase, so these needs can only be supplied by the conversion of their herds into coin of the realm, and this process is already in course of fulfilment. At present many of the cattle available at public auctions are brought from Jubaland and the Abyssinian border by Somali traders, and in certain districts these cattle thrive well, although very susceptible to East Coast Fever.

SUITABILITY  
FOR GRADING.

As already indicated, the native cow is admirably adapted to grading. The offspring of the pure bred bull and native cow as often as not so resembles its male parent as to be almost indistinguishable from those of pure breeding. The shoulder hump has gone; so too the drooping quarter; the ribs are well arched and evenly covered with flesh; whilst, if the sire belongs to a milking breed, the yield of milk is three, four, and even six times as great as that given by the dam. Nor is it one pure breed only which stamps its characteristics upon the offspring; practically all that have been tried in the colony have shewn this prepotency to a marked extent. In herds in which a Shorthorn bull is used, the young stock—even of the first cross—are Shorthorns in make and shape, an occasional example of unorthodox colouring alone indicating descent from a breed in which almost every variety of hue is to be found. The improved dairy qualities of the half bred are nothing short of marvellous. The quality of the milk given by the native cow is so remarkably rich—containing something like six per cent of butter fat—that the enormously increased bulk yielded by the graded animal will still shew an excellent analysis, and, more than this, the lactation period frequently lasts until the cow is again near to calving.

VALUE OF  
DAIRY  
PRODUCE.

Hitherto a ready market has existed within the colony for all the butter and cheese which could be produced, whilst the demand for milk in Nairobi, Nakuru and elsewhere steadily increases. An up-to-date creamery at Lumbwa affords an outlet for the cream produced in those districts too far removed from the centres of population to profit by



milk selling, and as soon as others are equipped and the produce properly graded and packed, there is no reason why a remunerative export trade should not be established. Later on, when cold storage facilities are provided, B.E.A. should also play a prominent part in making up the great shortage of beef which is steadily becoming more acute in not be very near, but it is bound to come as soon as Europe. The day when beef will be exported may one or other of the great meat importing firms at home realizes the vast possibilities at present lying dormant in the native reserves.

Having set forth some of the many facilities for cattle farming in B.E.A., it is only fair that the drawbacks and difficulties should be examined. That these exist will be readily admitted by every settler, but serious although some of them may appear at first sight, there is not a cattle farmer in the country who is in any way discouraged by them. First and foremost among the drawbacks must be placed the long list of diseases endemic to the Protectorate. They make a formidable array—although many of them, as for example rinderpest and pleuropneumonia, appear in so attenuated a form as to be far less harmful than the same complaints elsewhere. Perhaps the most prevalent disease of all is East Coast Fever, which is endemic over large areas, but not in the Great Rift Valley, which has, in consequence, come to be the headquarters of cattle breeding. Heavy losses were formerly caused by this disease, but they have steadily been decreasing since the introduction of dipping, and dipping tanks have during recent years been installed throughout the country. Rinderpest has lost the terrors it formerly had since the Government Veterinary Department has provided the means for inoculation with virulent blood and serum. The same Department provides effective sera for preventing the spread or the occasional outbreaks of Black Leg, Anthrax and the Colon Bacillus which have occurred in various districts. A magnificently equipped laboratory, possessing a staff of highly trained and enthusiastic scientists is ever ready to assist the settler to diagnose and, if possible cure, free of charge, any complaint which makes its appearance amongst his stock—a privilege of which the settler makes full use. Contagious abortion is

DIFFICULTIES  
ATTENDING  
CATTLE BREED-  
ING.

EAST COAST  
FEVER.

GOVERNMENT  
ASSISTANCE.

known in the country but has hitherto not caused much trouble, whilst white scour in calves and sundry other maladies which occasionally crop up appear to yield to that panacea of all ills—the dip.

COST OF LAND.

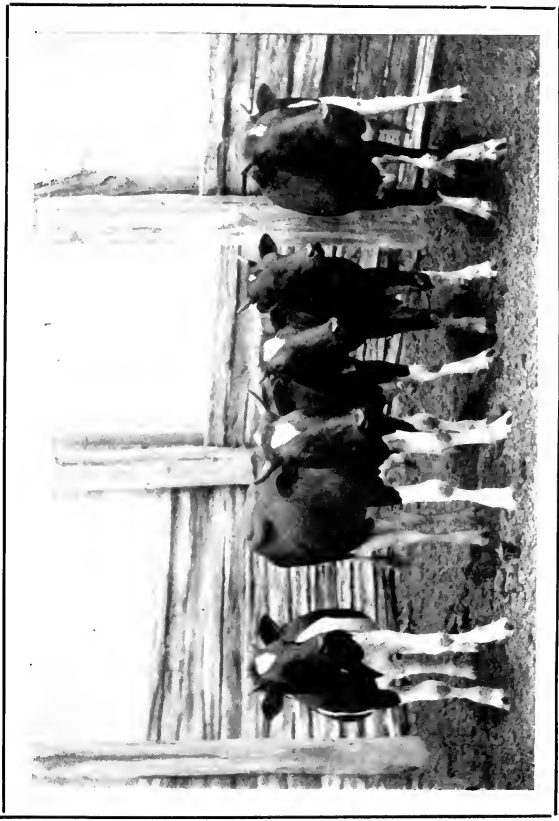
For some years previous to the outbreak of war, the rapid increase in the value of plantation land had its influence on areas only suitable for stock, and owners of such land were loth to part with any portions of it except at a high figure. But many of them hold acreages so vast that they could never be adequately stocked by a single individual unless ranching were possible, and there is no doubt that some of them at any rate will be willing to sub-divide their holdings later on. Moreover, land at some distance from the railways can always be bought at a reasonable price, whilst hundreds of thousands of acres of what is probably the best cattle country in the Protectorate have already been surveyed on the Laikipia plateau and elsewhere, and this land should be obtainable at prices well within the reach of men of quite moderate capital.

A GREAT STOCK DISTRICT.

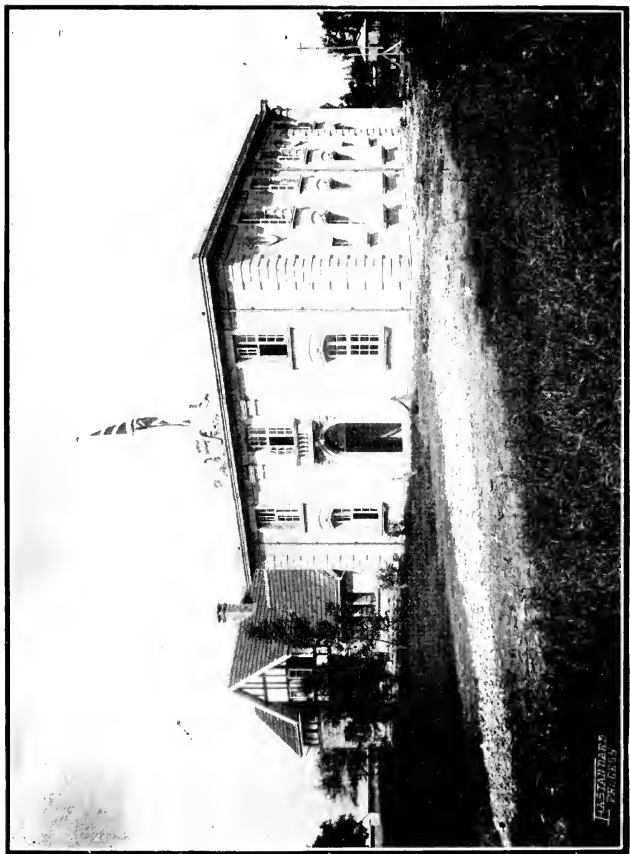
COST OF STOCK.

As already mentioned the price of native cattle tends to increase, but even should the settler pay up to £12 for a cow, the investment should prove sound when the half-bred produce of this animal may realise double that figure. As soon as the native comes forward as a vendor of cattle the price will automatically fall again, and good stock be available to the white farmer. An even more serious difficulty at present confronting the cattle breeder is the scarcity and high cost of suitable bulls. The Government Farm at Naivasha is at present the principal source of supply of pure bred bulls, and so great is the demand that prices up to £120 are realized at the annual sales. The highest prices have generally been paid at these sales for Ayreshire bulls, which have been found specially suited to use with the native cow, but Shorthorns, Herefords, Holsteins, and their grades, all meet with a keen demand. The few breeders who have been enterprising enough to import pure bred cattle of both sexes have also reaped a rich harvest by the sale of their young bulls, even a moderate Shorthorn commanding a price of £50 at any time.

PURE BRED BULLS.



A MOB OF GRADES.



FRASER & NEAVE  
1905

EXCHANGE BUILDINGS, NAIROBI.

**I**N this connection it may not be out of place to enquire into the cause of the popularity of the Ayreshire. First and foremost, this breed appears to "nick" extremely well with the native cow, to which it imparts the deep milking qualities for which it is renowned. But it is only fair to state that the Government Farm has been the fortunate possessor of several exceptionally good examples of the Ayreshire, whilst the representatives of the Shorthorn and Hereford breeds which have from time to time been imported for the Naivasha farm have seldom been more than fair specimens of the average "farmer's bull." Indeed until quite recently the principal sire of the so called Shorthorns at that establishment was a Lincoln Red—an extremely good animal imported from South Africa—but one in whose veins was not a drop of Coate's Herd Book blood. The Hereford has not been popular at the Government Farm of late years, although several settlers in the Naivasha district are great admirers of the breed, which has done well in their hands. Holstein-Frieslands have done well, and owing to their deep milking propensities are very popular with the settler. One or two Devons, a few Red Polls, a Guernsey and a Jersey, are others that have been used elsewhere, and in every instance the improvement noticeable has been most marked. Hitherto the milking strains have been the most popular, but breeders are gradually awaking to the necessity for producing a big and powerful animal suited to draught purposes, whilst later on the demand for meat, which is sure to be felt, will give them more encouragement to turn their attention to the Shorthorn and other dual purpose breeds. When this time comes the East African will realise, as others have done, that the Shorthorn is not only suitable for the butcher's block, an idea very prevalent at the present time, but is the best all round animal.

POPULARITY  
OF THE  
AYRESHIRE.

OTHER  
POPULAR  
BREEDS.

VALUE OF THE  
SHORTHORN.

One of the greatest attractions of East Africa to the average Britisher is the marvellous abundance of its wild fauna. From the point of view of the Sportsman and Naturalist it would be an evil day when the herds of game disappeared from the veldt, but there is no gainsaying the fact that their presence on a cattle farm is always a menace on account of the diseases they may bring. The buffalo,

GAME INIMICAL  
TO STOCK.

**VALUE OF  
DIPPING.**

eland and some others are peculiarly susceptible to rinderpest, which they spread broadcast, whilst even the zebra disseminates an intestinal worm harmful to domestic stock. Lions abound in many parts, and occasionally take toll of the settler's herd, whilst rendering yarding at night essential, and thus preventing the practice of ranching, which otherwise would be advantageous. Now and then snake bite causes the loss of an animal, but for a tropical country, East Africa is wonderfully free from poisonous reptiles, while comparatively few of its rivers are infested by crocodiles. The tick bird is probably an ever present disseminator of disease, but here again the use of the dip is efficacious in exterminating the insect on which it feeds.

**THE IDEAL  
STOCK FARM.**

Throughout the country may be found land suitable in every particular to stock, but should the prospective cattle farmer fail to find such a locality within the reach of his means, he need not be disheartened, for tens of thousands of acres of land at first sight unsuitable may well be turned to account for the purpose. The East African cow wanders great distances whilst grazing, and, also, requires water at less frequent intervals than its European sister; one drink at mid-day being ample for its requirements. Hence an otherwise desirable cattle farm should not be rejected on account of the distance of water from the homestead—even several miles being none too long a journey for the mid-day drink. The power of the sun at mid-day is trying alike to man and beast, so that a farm possesses a valuable asset if there are shady trees upon it; and cattle will thrive well if they can rest in the shade during the heat of the day. In certain districts, notably on the borders of Nairobi, buffalo grass grows in profusion; and where this is the case the cattle farmer may consider himself fortunate, for no better feed exists in the world. As already mentioned, clover and sainfoin are found elsewhere, whilst all the native grasses appear to contain an immense amount of nutriment, even during the driest periods of the year; but these periods are of short duration, for East Africa is fortunate in having two rainy seasons, so that the grass is growing for more than half the year.

**WATER  
SUPPLY.**

**THE NATIVE  
HERDSMAN.**

Several of the East African tribes are born herdsmen, whose sole thought is for the welfare of their

cattle. Each mob is usually under the care of a Masai, Lumbwa or Nandi, who, armed with an umbrella and a spear, accompanies his charges to the grazing ground, whistling soothing notes the while; and brings them back to the "boma" or yard at night. He is ever ready with assistance to the calving cow or animal in trouble, and will if necessary pass the whole night in attendance upon it. He usually has a remedy ready for every ailment, but is generally willing to call in the assistance of the white man, whose cures he is gradually learning to regard as more efficacious than the bleeding, searing with hot iron, or puncturing of the ear, which are the usual antidotes of all cattle ills with him. But good herdsman as is the native, his qualities as a stockman are limited. As a rule, he is a shockingly bad milker, and his knowledge of the principles of breeding are limited to the selection of his breeding stock by colour alone. A few natives, notably the Kavirondo, use both hands for milking; but the usual method is to milk with one hand, as the operator squats on his haunches, holding a tin in the other. Here and there one may find a Kikuyu who has learned the art of using both hands, but they are few and far between. Nearly all natives are extremely fond of milk and vigilance is necessary to guard against pilfering; the attendant being, as a rule, fully conversant with such tricks as watering the milk, in order to secure some for himself. Cattle thefts by natives no longer cause so much annoyance as was formerly the case, but care must be taken to guard against it, the native considering that, if the owner does not make a frequent count of his stock, he will not miss the one or two head annexed by him. The cause of all deaths should also be fully investigated, as the wily native has been known, not infrequently, to aid the departure of a beast to another sphere, in order to gratify his craving for meat.

**KAVIRONDO  
GOOD  
MILKERS.**

**WORDS OF  
CAUTION.**

In spite of its drawbacks, East Africa is probably destined to be—for its size—one of the greatest cattle breeding countries in the world; for it is one of the very few parts in which no artificial feeding is required; while its climate is perfect, and grass grows luxuriantly during many months of the year. Moreover, its cattle are constitutionally strong, and many of them immune from the diseases which pre-

**A PROMISING  
OUTLOOK.**

vail, whilst they readily respond to the process of grading. Possibly, the best advertisement the Protectorate possesses at present may be found in the fact that, although still in its infancy, cattle breeding has already progressed so far. Without in any way disparaging the efforts of those who have built up good herds of graded cattle, it may be stated as a fact that with very few exceptions this has been accomplished by amateurs in cattle breeding. Some have made the mistake of using bulls of different breeds—*mainly* owing to the difficulty of obtaining sires—but even in these cases the results have been little short of amazing. Go where one may throughout the length and breadth of the Protectorate, one finds that every farmer is firmly convinced that his own farm is the best in the country—and where such a happy state of affairs exists there cannot be much wrong.

J. H. D. BEALES.

## MAIZE.

### A STAPLE FOOD.

**M**AIZE is one of the staple food crops of the world. The quantity produced is greater than that of any other cereal, and climatic conditions alone limit its more widespread cultivation. In those countries adapted to its production, it is more extensively grown than any other grain. The total world's crop reaches the high figure of 1,085,700,000 two hundred pound bags, of which more than 75 per cent. is produced in America. Only about one per cent. of the world's supply is produced by Africa.

### ITS ECONOMIC VALUE.

Maize is one of the easiest grain crops to grow, and it stands more rough usage than perhaps any other. Its farm value must not be calculated solely on the yield of grain, important as that is, for its total yield of vegetable matter is larger than that of almost any other crop. Maize produces a large amount of stalk and leaves of considerable value after the ears have been harvested, for the feeding of stock. As silage material maize is one of the very best crops that can be grown, on account of its heavy yield per acre and also because of the succulence and physical character of the plant, which renders it peculiarly suitable to the process of ensilage. Maize is a white man's crop—by which is



meant that the margin of profit derivable from its production amply compensates the European for his expenditure of enterprise, energy and capital. Even in America where the rate of wages is high, this is so; how much more profitable should it be then in B.E.A. where the soil and climatic conditions are not less favourable to its cultivation and where the cost of labour is considerably less.

At the present time East Africa has only begun to shew that it can produce a maize equal to anything found in the world's markets. The traveller is impressed by the enormous areas of fertile land suitable for growing maize in the Nakuru districts, which are at present untouched by the plough. So far the average yield is about 11 bags per acre, but it has been clearly proved that this yield can be brought to as high as 16 bags per acre by means of good farming, good management, and careful selection of seed. No country in the world has such a perfect climate that the farmer is entirely free from worry whatever his crop may be, and no claim is made for East Africa being an exception to this rule. But it is claimed that the climate of the Highlands is as near to being perfect as could be reasonably expected, and certainly as regards the cultivation of maize it has less drawbacks than have to be contended with in most other maize producing countries.

POSSIBILITIES  
OF MAIZE IN  
B.E.A.

Maize lands should be well drained, for wet soils are usually cold and retard germination. Its growth is also backward on water-logged soils, the stalks remain dwarfed, and the foliage turns yellow.

SOILS.

Shallow ploughing causes the maize plant to suffer from drought in a dry season, and on some soils from water logging in a wet one. It has been clearly demonstrated that deep ploughing conserves soil moisture, and on wet soils deep ploughing allows the surplus moisture to drain away better. Seven to eight inches is a good depth for ox ploughing and twelve to fifteen for steam ploughing. Whether it is done well or badly, ploughing is a slow business, so that it should be done well.

PREPARING  
THE LAND.

Maize requires a deep, loose seed bed, and to provide this it is essential that particular attention

be paid to after preparation of the bed. This will vary in different soils and districts. New land broken before the short rains may be allowed to lie fallow to weather and kill the sod; old lands broken in the short rains should be pulverized at once and harrowed to conserve moisture for early planting. Cross ploughing is a useful method of treatment for closing up air spaces by drawing together the sod.

#### METHODS OF PLANTING.

East African farmers enjoy a distinct advantage in having a planting season spread over six to eight weeks—starting early in March and continuing into the beginning of May—as against three weeks in America. Maize may be planted either by listing, which is the general practice in America, or by planters, which are in general use in Africa. Planting by listers is for dry districts, where the maize must be planted deep to get sufficient moisture for germination. Planters are used for surface planting, when the seed needs to be dropped only about two inches below surface. The great advantages of the planter are uniformity of distance and depth, rapidity of work and economy of labour. Check rowing on small areas has an advantage, in that it enables the planter to cultivate both ways, but it takes up time. Moreover, when check rowing three or four plants to a hill the results appear to be unsatisfactory unless the surplus plants can be pulled out, which entails a lot of labour. If check rowing is practised, care should be taken in removing surplus plants. The continuous planting known as drilling seems to be the best for East Africa.

#### PLANTING DISTANCES.

The distance of planting is an important consideration. Too close planting reduces the amount of plant food available for each plant, maize being a surface feeder; and in dry weather it reduces the amount of moisture available. It also prevents proper weeding. On the other hand, too wide a distance leaves over much land lying waste. The average distance found satisfactory in some of the maize districts is three feet by one foot in the case of new land, and three feet four inches by fourteen inches in the case of old. For fodder maize, the distance may be three feet by eight inches.

#### CULTIVATION.

Maize requires good cultivation, the prevalence of weeds being a serious hindrance to heavy yields.

The eradication of pig weed, quick grass and other weeds is one of the most important problems for the farmer. Fallowing of the soil and rotation of crops do much to reduce the weed crop, but frequent use of the cultivator is most successful. Cultivation not only helps to keep the soil clean, but also assists to retain moisture in the soil by forming a mulch. Maize should be cultivated between the rows at least eight times in the season, and it is a good plan to reckon one small cultivator to every forty acres. Care should be exercised in cultivating, as if the implement goes too deep or too close to the plants it may prune off a proportion of the roots, which will considerably reduce the yield

With the exceptions of rust, smut and blight, which do not affect the yield at present, maize is, broadly speaking, very free of disease. The principal insect and animal pests are cut worm, porcupine and wild pig. These may be easily kept in check by poisoning and shooting, but we are very favourably circumstanced when compared with America, where there are 214 species of insects known to be injurious to maize.

DISEASES AND  
PESTS.

The usual method of harvesting in East Africa is to pick the ears by hand when they have become thoroughly dried by the sun. Maize is less easily harvested than almost any other cereal crop because of its large size and hard stem. But while native labour is cheap and plentiful hand labour is the cheapest, and likely to remain so until the maize harvesting machinery placed on the market in recent years is made less costly and less complicated.

HARVESTING.

The methods of cultivating maize in East Africa have been dealt with at some length for the reason that maize should make a strong appeal to the new settler starting in agriculture. It enjoys distinct advantages over coffee, flax or citrus, for instance, to make a start on. It entails less expenditure of capital, less labour, less expert knowledge or acquaintance with local conditions, and gives quicker, if smaller, returns. New land intended for coffee or citrus is improved by having had a crop of maize raised on it beforehand; it takes comparatively little nutriment out of the soil and leaves the land in a better state of tilth than would be possible otherwise without considerable labour. Maize gives a quick

ADVANTAGES  
OF STARTING  
WITH MAIZE.

return, and unless the new comer is furnished with ample capital, he will find it a distinct advantage to start off with maize, gradually planting up with coffee or citrus as he is able to increase the amount of land broken up, even when the ultimate intention is to raise coffee or citrus.

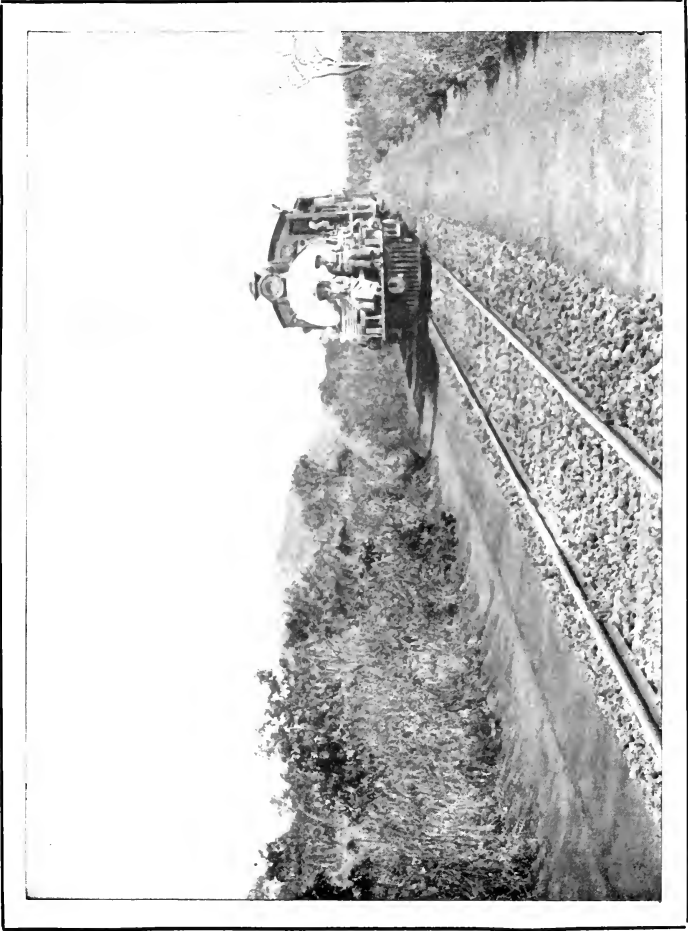
**CERTAIN.  
MARKETS.**

Although at the present time the whole of Africa produces only about one per cent. of the world's output of maize, and of this East Africa contributes but a small proportion, the areas available for maize in the Highlands—without including doubtful land—are sufficiently large to give East Africa a position of importance in the maize markets of the future. No export trade worth mentioning has been done up to the present, and, in view of the immense local consumption (maize being the staple food of the bulk of the native population) the surplus available for export in the immediate future is not likely to run to very big figures. But the prospects ahead of maize cultivation in B.E.A. are immense, nevertheless. There are hundreds of thousands of acres capable of producing heavy crops. The cost of production is low—probably less than in any other part of the world. The local market is in itself sufficient to absorb a large proportion of the output, and, given proper export facilities such as are enjoyed by other maize countries, the overseas markets available for the surplus represent a demand that should guarantee a profit to the producer. At the present time the Nakuru district is responsible for the bulk of the maize produced in East Africa, but the amount of land devoted to it in other districts is being steadily increased.

**YIELDS.**

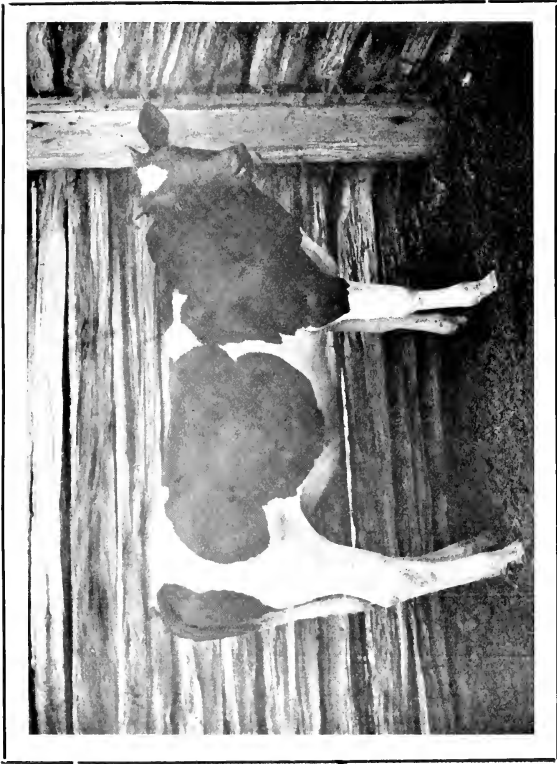
On the question of yield it has been stated that the average is about eleven bags. This, let it be clearly stated, should be read as a conservative estimate. There are parts where an average of 15 bags over large areas is claimed, and the writer has heard of much larger yields over small acreages, but he prefers to confine himself to a statement that will bear the closest investigation, and leave a margin, rather than inspire unfounded optimism. Eleven bags to the acre, with the cost of production as low as it is, give a sufficient financial return to make maize highly profitable, and should go far toward making East Africa better known on overseas markets.

J. BROWNE.



*Photo by Lt.-Col. Sturdy.*

**THE IRON ROAD TO THE HIGHLANDS**



GRADE HEIFER.

## DAIRY FARMING.

**A**LTHOUGH we are on the equator the altitude is CLIMATE such that the heat is not so much felt as it FAVOURABLE. often is on a hot summer's day in England. No doubt this is also due in part to the dry winds that blow even in our hottest seasons. The highlands extend over a great portion of the Protectorate, and are suitable for stock farming and a great part of them for dairying.

The natives own large herds of cattle and NATIVE STOCK. sheep, which have increased enormously in spite of outbreaks of diseases of one sort or another that in the past killed off their cattle in hundreds. Now that we have the advantage of recent veterinary discoveries, most of the diseases which decimated herds are things of the past on a progressive farm.

The native cattle are humped like the Indian GRADE STOCK. Zebu to which they are doubtless related. These have been successfully crossed with most of the European breeds of cattle; though the Shorthorn, Hereford, Ayrshire and Friesland crosses predominate. This grading up has progressed so far that 15/16th pure bred cattle are frequently seen, and in some cases even higher grades have been attained by the earlier settlers.

Pure bred cattle of both sexes have been im- PURE BRED. ported both by the Government and by private individuals. The former hold a sale annually of surplus bulls bred by them and these sales are well attended and competition is keen.

The dairy districts are already turning out BUTTER butter in large quantities which find a ready OUTPUT. market in the towns of the Protectorate. Doubtless co-operative dairies will be started in the best centres as soon as the demand for them warrants. There is already one doing business on a large scale at Lumbwa. The future of dairying in this country is enormous and there is no reason why we should not rival Australia, New Zealand and Canada in the world's markets. We may confidently rely on the Government to grade export

dairy produce when the supply of it warrants, in the same way that they grade maize, etc. Naturally we cannot hope to get the same price for export as we do in the local markets; but who will deny that handled by a co-operative society on a sufficient scale and with our low running expenses, we can do as well as other colonies with high rents and wages.

LIFE ON THE  
FARM.

Now let us take a look at the life on a small dairy farm. Here we have one of say 1000 acres, that will carry a beast to a couple of acres with ease. In parts you can run more, such is the luxuriance of the growth, and that without stall feeding. On the farm we are looking at, there is a comfortable house of stone and thatch for the settler. Stores, stables, dairy, pigsties, and native huts are near by, as well as a flower and vegetable garden. The whole gives one the idea of a miniature village. The cattle are in a wire fenced paddock not far away, with the herd-boys' huts near the entrance.

EARLY  
MORNING  
WORK.

The sun rises shortly before six and the morning is like a spring one in the Old Country, bright sun and a clear sky, but there is a nip in the air. We are out by 6-30 to see the cattle milked, and it is a curious performance. All the calves have been in sheds for the night and they are let out one at a time as required. Directly a calf leaves the shed it goes straight to its mother and has a suck, then, when the milk flows, the milker squats beside the cow with a switch handy and with a tin in one hand he milks with the other, every now and then admonishing the calf with the switch. When he has taken enough milk the calf is left to finish off the supply. The amount taken is governed by the condition in which the calf is to be kept: from each cow the milker will get from one quart to half a gallon at a milking. When the milking is finished we go with it to the dairy to see it separated while the cattle are taken out to grass by the boy in charge of them.

AFTER BREAK-  
FAST: DIPPING.

After separating is finished we breakfast and then, if it is dipping day, go to see the cattle through the tank and to see that there are no accidents. Dipping is one of the greatest boons to the



stock, it frees them from ticks and so keeps down the spread of diseases. The cattle are driven into a crush and from that to the tank, where they jump into six feet of medicated water and swim to the far end, whence they walk out and up a concrete floored race where they drip and partially dry. Dipping done we have work of one sort or another to do, either butter or cheese to make, a house to build, a fence to mend or any one of the things that constantly need attention on a farm.

About mid-day we knock off for lunch and the work boys, who started work at 6-30, get an hour off, and then work on till 5-30, when work for the day is over for them. After tea, which we have about 4 o'clock, we go to watch the milking again. The calves of those cows that are milked in the evening were separated and herded by themselves after the morning's milking was finished. MILKING.

The sun sets about six and it is dark about half an hour later, so we finish up our day with a spell in the office before supper and then after a chat round the log fire we turn in.

Sunday is the one day of the week when there is no work save for the milking, and as a rule we go off to visit a neighbour or he spends the day with us. We also do a bit of shooting that day if the larder is empty.

But, you will ask, how is the new comer to start? I should advise him first of all to decide what line of work he means to take up, planting, agriculture or dairying. If he has not decided this let him spend a time visiting the different centres and studying the life, and when he has made up his mind, let him put in a year on the farm of one of those who have spent years in studying the local conditions that govern that particular line. A year spent on a farm as a pupil will not by any means be wasted, as the new comer will be able to learn the language of the country, without which he will be at the mercy of an interpreter, who is not always a disinterested party. He will also see the methods adopted out here, where conditions are so different from those at home. The time and HOW TO MAKE  
A START.

money spent in this way should be a sound investment, as it will enable him to gain much experience.

CAPITAL  
REQUIRED.

The amount of capital needed for a start depends on many things. Are you to get a farm near the railway or out at the back? What stock are you going to have—the native, grade or pure bred? They have all advantages and disadvantages. Are you going to live simply and work hard or are you going to live on the fat of the land and pay a manager to do the work? Are you going to start in a small way and work up, or on a large farm and hang the expense? In any case the more capital you have the better. I will try and give you an idea of what I think is the irreducible minimum.

Premium	...	...	£100
Land 1000 acres @ say 10/-	...	...	500
Transfer and Legal expenses	...	...	20
Rent (2 years) say	...	...	10
Tools, fence wire, cart, etc	...	...	100
Bull (pure bred)	...	...	60
36 cows and calves (Native)	...	...	360
28 dry cows do.	...	...	200
8 trained oxen	...	...	50
Three months' running expenses	...	...	20
Dip for cattle	...	...	200
			<hr/>
			£1620

POINTS TO  
CONSIDER.

The price of the land depends on its grazing value and proximity to the railway and something might be saved there. The need for a dip depends on how near the public road the farm is, and if the farm were at the end of a road and immune oxen were used, it might be possible that a couple of adjacent farms could put in a dip between them. A further saving might be made by using a grade bull instead of a pure bred bull but the calves are not of so much value.

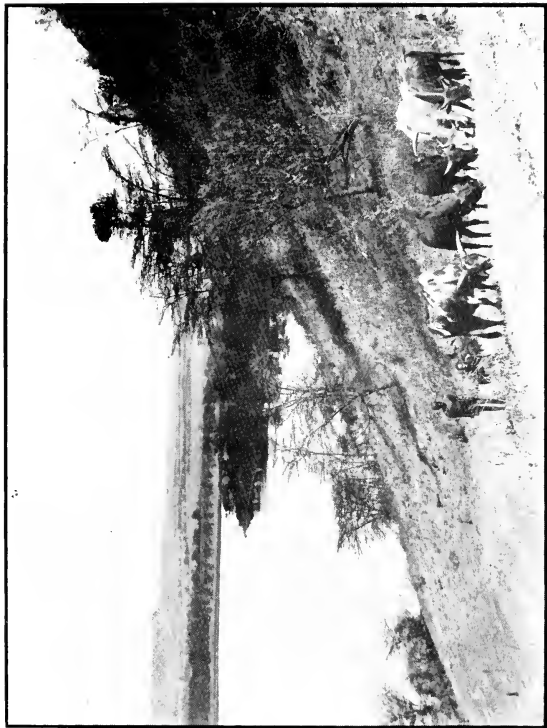
RETURNS.

After paying living and running expenses, the return from this outlay does not amount to much until the first lot of calves are two years old, when the bulls may be sold off. If half the calves were



*Photo by W. D. Young.*

**DOMESTICATED ELAND ON A STOCK FARM.**



*Photo by W. D. Young.*

**A CORNER OF LAKE ELMENTEITA.**

bulls they should bring in a further £150, increasing as the head of stock grew. Then when the farm is stocked up, which should be in about six or seven years from the start, and supposing only one beast could be run to two acres, there will also be the female increase to sell off. If the land is of reasonable quality, when the farm is stocked up with decent milk producers, giving say a gallon of milk a day besides rearing the calf, and the cattle graded, then the return from it should be in the neighbourhood of £3,000 a year, out of which running expenses must be paid. This is based on pre-war prices.

On the whole I think one may safely say that there is a good prospect out here for any man who is keen on dairy work and does not object to working hard and living plainly at first and who has a capital of at least £1,500 when he lands in the country.

R. B. CURWEN.

## DECIDUOUS FRUITS.

**I**N B.E.A., where the soil in many places is equal to any in the world, the apple, pear, peach and plum, can be grown par excellence from an altitude of four to eight or nine thousand feet above sea level.

A number of orchards, principally in the Machakos and Limuru districts, are already supplying the local markets with fruit; numerous others have been laid down in different parts of the Protectorate, and the volume of production likely to be available in the near future is such that several schemes for canning factories are under consideration.

Because of its commanding popularity among the European settlers, the apple is receiving first consideration from deciduous fruit growers, and a large range of varieties has been experimented with.

SELECTING  
THE BEST  
VARIETIES.

All varieties, however, will not prove sufficiently productive to justify extensive cultivation, and so the planter will naturally choose those which have proved themselves the best under our climatic conditions, both as regards fertility and the quality of the fruit. For instance, there are more than thirteen hundred separate and distinct kinds of apples, yet not more than twenty-five of these are in general cultivation. Local experiment and experience are the only reliable tests as to the suitability of any particular sort of tree to a neighbourhood. The plan of consecutive cropping by planting late and early varieties, so much practised in England, is not of much advantage in this country, where both late and early varieties are in bearing practically all the year round. In selecting varieties, therefore, planters would be well advised to give little heed to whether varieties are "late" or "early," but to concentrate on those known to do best in their district.

THE RIGHT  
STOCKS.

After the finding of proper climatic conditions, soil, and varieties of tree, the most important consideration is to find the right stocks. If the land to be planted is on a high and well drained situation, peach stock for both plums and peaches, and pear stock for pears, will be found the best for this country. For apples, the planter has to select for himself between Northern Spy and Paradise stocks. The advantages of the former are that it is absolutely blight proof to the graft, which is about twelve inches above ground level, and that it makes a large tree and therefore is capable of carrying more fruit; of the latter, that it dwarfs the tree, keeping it within easy reach for pruning, spraying and picking. Also, the apple tree on Paradise stock usually comes into bearing earlier than the same apple tree grafted on to Northern Spy.

PLANTING  
DISTANCES.

The proper distances to plant are approximately, twenty to twenty-four feet apart for Standard Apple trees on Northern Spy stock; dwarf apple trees on Paradise stock, twelve feet; Peaches, Nectarines, Apricots, and Pears, twenty-four feet; Plums, fifteen feet; and Dwarf Pear trees on Quince stock, twelve feet.

Before obtaining fruit trees, the planter should thoroughly cultivate the land. In the case of virgin soil a crop of mealies should be put in the season before. Holes three feet square by two to three feet deep should be dug beforehand, so that the newly planted trees may get all the moisture and rain available, and that the roots may have a chance of spreading rapidly, which is essential to the formation of a strong healthy tree. Any white ants in or near the plantation should be dug out or otherwise destroyed, as these pests are very destructive to fruit trees in this country. As in South Africa, they ring bark many of the young trees. Thorough and constant cultivation, however, keeps them in check.

PREPARING  
THE LAND.

A windbreak of Eucalyptus gums or other quick growing trees, should be planted to protect the trees from shedding their blossoms, and from the strain of high winds when the branches are fruit-laden.

WIND BREAKS.

If the planter purchases his fruit trees direct from the nurseries, and does not propagate them himself, he should place them under shade immediately on arrival, and water well. He should then take each tree separately and prune the roots. Every root broken or bruised should be cut clean with a sharp knife, and every dead root should be taken out. The trees are then ready for planting. It may often happen that when the trees have taken three or four weeks in transit, they arrive with suckers starting to shoot up from the roots. All these should be taken off before planting. If the main stems are dead on arrival, however, one or two of these suckers may be left to grow, and these will give in six months time a stock on which to graft or bud a good variety.

PLANTING UP.

The best time to plant trees in this country is at the beginning of a rainy season; but they may also be planted in between seasons if well watered at the time of planting, and regularly thereafter at frequent intervals. The shamba should be thoroughly cultivated at least once a week to keep down weeds, aerate the soil and to retain the moisture. If the ground is allowed to become

BEST TIME  
TO PLANT.

caked and hard at the surface, the fruit trees are doomed to failure. In this country the air is so dry in comparison with the moist climates of most parts of Europe, that only plantations of fruit trees, instead of the grass orchards found throughout England, would be successful.

#### CULTIVATION.

For cultivating the plantation, a single ox cultivator is the best, allowing the cultivator to operate close to the tree without injuring the branches, which often happens when more than one ox is used. Manuring is not necessary in the rich soil we possess in B.E.A. until the trees start to bear, and then the ground should only receive manure in proportion to what is taken from it by the fruit. Manuring young trees gives them an over luxuriance which is as bad as weakness of growth in a tree; both of which tend to make trees unhealthy and encourage disease among them. Ordinary farmyard manure has all the chemical elements required to promote growth and fruitfulness, so no artificial manures need be used. It should be spread broadcast throughout the plantation, and not merely around the base of each tree. Lime and bone meal in small quantities would be useful in old shamba-land which is deficient in these properties, but it is not likely to be needed extensively in this country for fruit cultivation for some years to come.

#### PRUNING.

Pruning should start as soon as the trees get established, and it will need close attention for a year or two to shape the trees well and to produce the fruit spurs in the best positions. This is done by allowing about four or five well balanced shoots only in the first instance, and these equally placed ground the tree. When the shoots have made good growth they should be shortened back to within one foot of the stem, and two shoots be allowed to form from the top of each former one, and again next season repeat the same process. This will give within two years time a well shaped tree, with numerous fruit buds all along the branches, well exposed to the sun and air, which will enlarge and ripen the fruit. When once the tree is symmetrical and well balanced, little further care will be necessary, beyond the cutting out



of all dead wood, and such cross branches as are cutting or chafing each other. It is well to remember in cutting stone fruit trees, such as plums and peaches, that the less cutting done with a knife the better, as they are very liable to bleed and lose a quantity of sap. It is as necessary with a plum or peach to get a well shaped tree, as with apple and pear.

Should an intending fruit grower read any large proportion of the numerous books on the market, dealing with injurious insects and diseases, he will most likely get such a shock that he will give up his fruit growing intentions altogether. But if pests and diseases are rightly considered, they are easy to overcome, and they also serve the purpose of keeping the fruit grower in a state of mental alertness! In this country fruit trees should be sprayed three or four times yearly—when they are in blossom, when the fruit is ripe, and once or twice during the dry seasons. Pests injurious to fruit trees may be divided into four classes:—(1) insects that eat or chew their food, which includes the whole tribe of beetles, worms and caterpillars. These can be destroyed by spraying with an arsenical mixture. Paris Green is generally employed for this purpose. (2) Insects that suck their food, as plant lice and scale, which are destroyed by kerosine or resin washes. (3) Parasitic fungoid diseases, such as canker, mildew of the grape, or apple scab. When any of these show themselves, the trees should at once be sprayed with one of the many fungicidal mixtures on the market. And (4) lastly, there are bacterial diseases, or what may be known as conditional troubles. Such diseases are seen in the withering up of the foliage, and the drying up of part of the tree. There is no specific treatment for troubles of this sort, except cutting away dead or diseased parts and burning them. The old adage, "Prevention is better than cure," goes a long way in fruit growing. Insects follow on the heels of disease, and disease soon comes after injury done to the trees by insects. The causes of disease and injury should therefore be permanently removed as far as possible, and then spraying will keep disease in check and maintain the trees in healthy condition. The chief causes of

INSECT PESTS  
AND DISEASES.

disease in fruit trees are bad drainage, improper manuring, over cropping, over luxuriance, and weakness of growth.

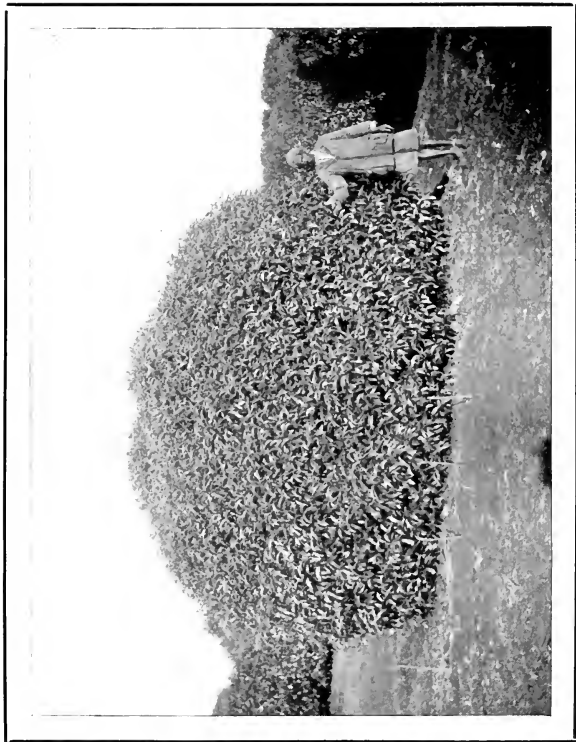
#### YIELDS.

Anyone who has seen fruit properly grown and taken care of in this country, will not question the statement that the yield per tree in British East Africa is greater than in any other country in the world, when the most productive varieties are planted under favourable conditions. It is nothing unusual to obtain £1 per tree per annum on an average for the fruit from apples, pears, peaches, and plums when the trees are in full bearing, if the fruit is sold locally.

#### PROSPECTS.

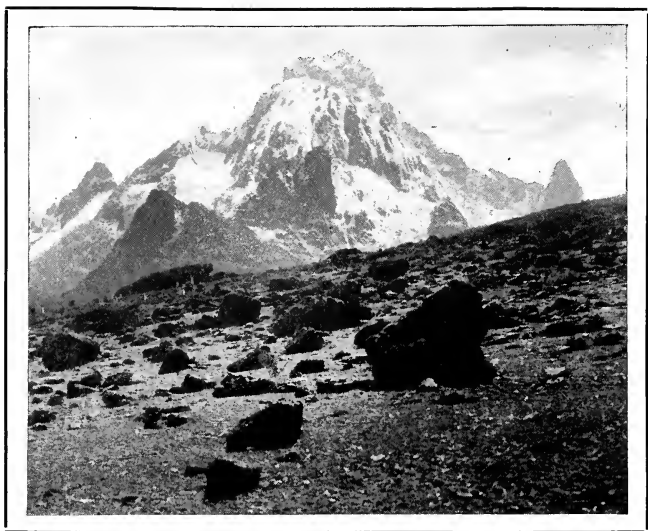
It is extremely likely that for some few years yet B.E.A. will consume all the fruit we can produce, but sooner or later there will be a surplus for export, and as soon as the war is over efforts should be made to organize proper marketing facilities for export to Europe, cold storage on the railway, at the docks and on the steamers. Given these necessary facilities, and government support such as is given in other countries, there is no reason why B.E.A. should not successfully compete with America, Australia and South Africa in the home fruit markets.

GEO. STUART WATT.



*Photo by Gletman.*

**TEA BUSH GROWN FOR SEED AT LIMURU.**



*Photo by S. T. Lydford.*

**THE SNOW CAPPED PEAKS OF MOUNT KENIA.**  
(18,620 FEET)

## SUGAR CANE.

TO write an article of any value on Sugar Cane AN INDUSTRY growing in B.E.A. is rather a delicate task. The STILL IN ITS fact is that the industry is in its very earliest stages EXPERIMENTAL and accurate experiments so far are on so small a STAGES. scale that it is rather dangerous to rely on them too confidently. Yet, so far as these experiments go, they point to great possibilities; and the matter is certainly worth following up.

I shall not here enter into any elaborate details of culture or manufacture. Anyone who wishes to go into the matter thoroughly should study the numerous publications on the subject, a useful collection of which are now available in the Library of the Agricultural Department at Nairobi. I propose to give a very short sketch of what is at present known of the Sugar Cane in this country, and to devote the rest of my space to suggesting some of the more important factors to be taken into consideration by any intending planter. Unfortunately, though it is not hard to point out the existence of these factors, it is as yet impossible to assign any definite value to each. So a big margin is left for individual judgment and willingness to take risks.

The cane appears to grow at all altitudes in B.E.A. from the Coast up to about 8,000 feet.

It seems to have been grown by most of the native tribes from time immemorial, but only for eating or as a source of *tembo*. None of the natives, so far as I know, used it for sugar making. Their system of extracting the juice consists in peeling and cutting up the cane, and pounding the pieces in a wooden mortar. The resulting "megasse" is then taken in handfuls, each handful wound round with a piece of stout string made from wild *Sansiviera* fibre, and wrung out as dry as possible by hand. The juice is diluted and fermented by gentle heat, and the resulting *tembo* drunk at once.

INDIAN  
EFFORTS.

There is also a small industry carried on by Indians in various parts of the country, in making *Gur* or *Jaggerce*. They grow small patches of cane, and extract the juice with small bullock mills—mostly of American make. The juice is boiled in a single pan over an open fire, till ready for the “strike,” when the pan is lifted off the fire and the contents poured into a shallow box to cool. The resulting mass is dug out as soon as it has set, and packed by hand into moulds—such as a small bucket—and left to harden. In some cases it is simply worked up by hand into balls. As a rule no tempering agent seems to be used in the juice, but I believe some makers add a little Magadi soda. The product of this process is used almost entirely by the Indians. It has a peculiar taste which Europeans do not as a rule like. Even the Natives do not buy it if they can get imported sugar, even at double the price.

THE FIRST EX-  
PERIMENTAL  
PLANTATION.

It is only quite lately that Europeans have begun to take any interest in the Cane, though the Agricultural Department published a small leaflet on it many years ago. So far as I know, the first sugar crystals to be made in this country were made by myself, at this farm, in March, 1914. I had been making experiments in growing the canes for some years previously. The mill was a Chattanooga 3 roller mill, moved by a pair of bullocks. The battery consisted of 5 cast iron pans set very roughly over a trench, leading to a chimney formed in a tall ant hill. This was experimental work, as we had everything to learn. The crystals produced were small and sticky, but the financial results were good enough to induce us to persevere. We installed the same plant in better style, and built the pans into a good stone furnace with a proper chimney and fire bars. We also fitted up a sugar house with barrels for draining the sugar in the old fashioned West Indian style. This turned out a very nice little outfit, and we produced some very respectable sugar, which we had no difficulty in selling at remunerative prices. At this time the Government Analysts very kindly took a lot of trouble in analysing canes and juices for us. We also kept careful records of the yields of different plots, both in canes and sugar. As all the results pointed to good yields and rich juices, we considerably increased the area under canes, and are now installing a larger mill driven by a water wheel, and

with various improvements in arrangement of the pans and other details. Owing to the war, however, we have still had to content ourselves with a comparatively primitive outfit. As I write the larger factory is unfortunately not yet running, so I am unable to give any figures of results. At the end of the article I give some figures of analysis of juices, and actual results obtained with our small mill which may be of interest. See "A."

In considering the future possibilities of this industry in B.E.A. it must be remembered that the country comprises great variety of soils, climate and temperatures, so that no general proposition can be true of the whole country. I give below an estimate of the areas available, as given by the Director of Economic Products in a report which I should recommend everyone interested to read for himself. It is to be found in the Library of the Agricultural Department in Nairobi, and is called "The British Sugar Industry. A Memo. regarding the possibilities of its development. West India Committee. March 4, 1914." See "B."

From these figures it will be seen that the largest areas are near the Coast, in the deltas of the great rivers. These areas may also probably prove best for the actual growth of the canes. But they lie in the less healthy parts, and from various circumstances would naturally seem to demand development by large capitalists or companies. The chief obstacle to such development would probably be Labour. From their position and large areas they would probably have to be run with a view principally to export trade overseas. Whether such plantations will ever come into existence depends greatly on what encouragement may be given to the industry by the Imperial Government after the war. It is worth noting that, judging from the above-mentioned Memo. there is plenty of suitable cane land in the Empire, but every country considers that future development depends on Protection and Labour Supply.

**SUITABLE  
AREAS ON THE  
COAST.**

Next to the Coast areas in extent come the Kibos and Kibigori lands near Lake Victoria—in fact part of the ancient bed of that lake. These areas are also probably among the best suited for exploita-

**THE LAKE  
DISTRICT.**

tion on a large scale, the climate seeming hardly fit for close settlement by Europeans. Good canes seem to be grown by the Indians at Kibos without any irrigation. The labour conditions in these parts should be good, and sugar produced here for local consumption or for sending further up country would enjoy a very useful advantage over imported sugar in the matter of freights.

#### POSSIBILITIES IN THE HIGH- LANDS.

I take it, however, that readers of this book are likely to be most interested in the possibilities of the industry in the Highlands, where Europeans can settle and work their own holdings in pleasant conditions. Though figures are only available over such a short time and small areas, and practically all on one estate only, I think it reasonable to suppose that canes will give good yields, under favourable conditions, up to somewhere about 5,000 feet. It is probable that much over this height the juices may prove less rich—but so far there are no actual figures to go upon. It is also probable that canes grown in swamps will give inferior results, though they make very handsome growth.

#### THE IDEAL CONDITIONS.

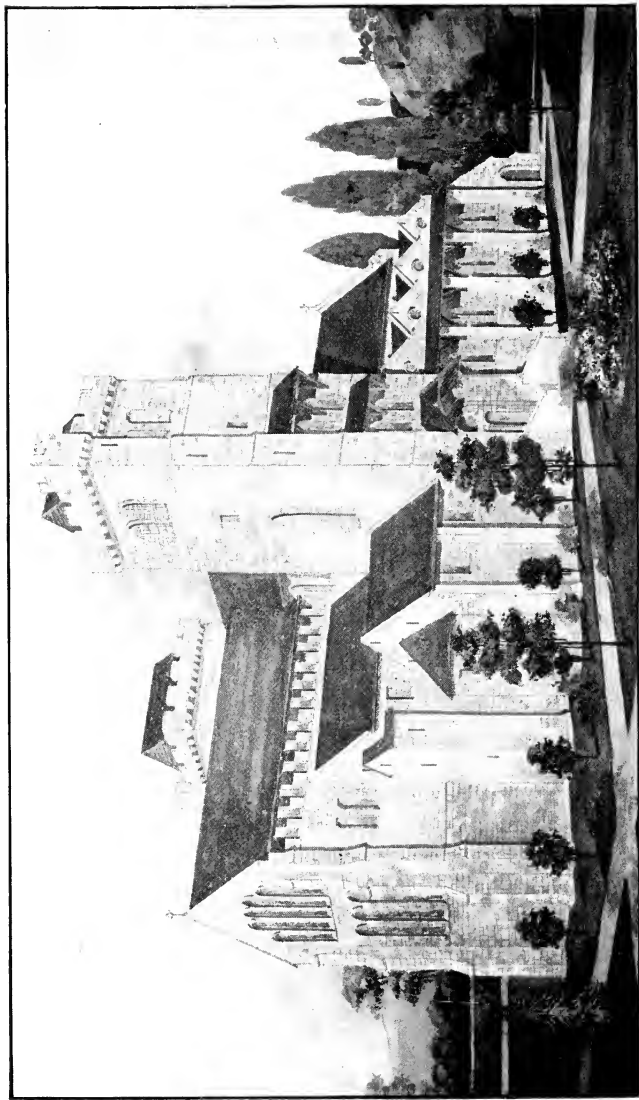
The following seem to me the ideal conditions for this country, so far as can be estimated at present:—Altitude: Below 5,000 feet. Any good soil, provided it can be well drained. Our canes have all been grown on rather heavy alluvial soil. It seems most important that there should be a good supply of water, so situated that it can be easily led out by cheap methods for irrigation and power. Fuel should be available in fair quantities, enough for at least 4 or 5 years, till artificial plantations can be fit for use. This is a very vital point, and where steam power has to be used instead of water for the crushing, it will be even more so. The question of planting up for future needs should be considered from the first. Position: The smaller the outfit the less nearness to the Rails will matter, provided there are neighbours to buy the product on the spot. Freights and transport, of course, act as a very useful protection under such circumstances. This in fact is one of the points that would seem to make it possible, even under pre-war conditions, to run even a cheap and wasteful plant with success, if used with proper care and intelligence.





*Photo by A. C. Barnes.*

**SUGAR CANE AT DONYO SABUK.**



ALL SAINTS' CHURCH, NAIROBI.

Under the heading of position should be considered another point, comparatively unimportant at the moment, but likely to be vital eventually. That is, the extent of land in the immediate neighbourhood suitable for canes, and whether that area would be sufficient to support a large modern factory in the future. For it must never be forgotten that, should cane growing attain to any important dimensions, the inevitable tendency is towards a concentration round large factories that can be worked economically. In such a case small, isolated plants would either have to close down, or keep running only by making raw sugar to be sold to the factories for refining.

AN IMPORTANT  
CONSIDERA-  
TION.

It should be mentioned that the Uba cane is present being tried on several farms in Kikuyu and elsewhere, without irrigation, and at altitudes considerably above 5,000 feet. None of these experiments have so far reached the stage of actual tests by milling. But I hear that the growth looks very good.

THE UBA  
CANE.

The following are some of the most important difficulties to be considered by an intending planter :

DIFFICULTIES  
TO BE CON-  
SIDERED.

As already pointed out, reliable figures as to yield are very scarce, and at present only apply to one area. Skilled workmen for the factory are entirely absent. If good results are to be uniformly obtained the most careful personal supervision is necessary in the factory. Where water power is not available the next best is steam power, as the waste steam can be used in the various evaporating arrangements. But the use of a steam engine will involve the employment of an expensive engineer, and extra expense for fuel probably. Any other power but water will considerably increase the capital expenditure on machinery. At present it is difficult to get any considerable supply of cuttings to plant out, even of the Native varieties. In any case the question of the supply of cuttings is quite a serious problem, as it takes about 10 tons of tops to plant up an acre.

Up till a few months ago the Native trade was large and rapidly increasing, and gave an outlet for one's worst produce at a useful price. But in this district the Government has recently put a stop to

THE NATIVE  
TRADE.

this trade, on the plea that a good deal of the sugar was used for making Tembo. This has made an enormous difference to the total consumption in the country—if such figures as I can get are correct it must have cut off nearly half the total. Whether this prohibition is to be extended to other districts, or even continued, it is impossible to say. But it is obvious that it has already very adversely affected the prospects of the establishment of a local Sugar industry on any large scale. This action was taken without warning and without any legal sanction so far as can be seen. It cannot be expected that people will invest large sums in an industry that is liable to be suddenly raided in this manner.

**LIKELY  
MARKETS.**

The total pre-war imports of the country could be produced by one moderate sized modern factory—so it would not be hard to overtake purely local needs. Once these needs are overtaken the whole proposition will assume a very different appearance. If produce has to be exported overseas it means working for a much lower price. To do this successfully would require the best of modern plants and management and a high yield from the canes. Presumably it would suit us best to look for new markets further up country rather than seawards. The possibilities in this direction are very great, but still latent.

**ADVANTAGES OF  
CLOSE SETTLE-  
MENT.**

Perhaps the most attractive point about a highly developed cane growing industry is the excellent prospects it holds out for closer settlement. A group of settlers round a central factory could do very comfortably off farms of 150 acres each with even 20 acres of good irrigable cane land. If the land were already under a main irrigation canal, a return from the canes could fairly be expected in 2 years from a start. Cattle work in excellently with any scheme of cane growing, as their manure is valuable to the canes, and spare cane tops and molasses are good cattle foods. It has long been my hope to see this section of the country—Donyo Sabuk—developed on such lines. It has always seemed to me to afford a quite unique combination of all the necessary qualifications for success.

**FINAL ADVICE.**

On the whole I am inclined to say to any intending planter just at present, "Go slowly, and feel your way very carefully. Don't trouble about it at all

unless all your conditions are quite favourable." Experiments with a small plant and carefully kept records will show what yields can be expected and what canes do best in each case. But a good deal more wants to be known on these points and above all about future economic conditions before launching out on a large scale.

Above all, remember that there is no other branch of Agriculture in which Combination and Co-operation are most essential, or in which they meet with a higher reward.

" A."

(Some notes of varieties and yields at Kiboko Flats, Donyo Sabuk. No fertilisers used.)

VARIETIES	AND YIELDS.
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There are some 9 varieties on trial. Of these none has so far given better results than the Native Red, which has given close on 50 tons of canes ready for milling per acre. The plot which gave this figure was by no means a picked one, in fact nearly a quarter of it was quite poor.

A Ribbon cane from Mazeras is a very nice quick growing cane with many good points, but not such a heavy yielder as the above.

A cane called No. 33 which we imported from Natal promises very well.

The Natal Uba cane is yielding heavily, but has a tendency to split—possibly it has had more water than it wants. The plot we have milled was too small to be worth calculating yield per acre from.

Of the W. Indian seedlings received from the Agricultural Department, the most promising is the Seely Seedling. But we have not yet enough of these canes for any milling trials.

The juices analysed by the Government Analyst have proved rich—giving from 18% up to 20% sucrose.

We have as yet no Laboratory figures of percentage of sucrose to weight of canes. But the

following are some actual figures of results obtained with the bullock mill, making Muscovado sugar. Separate records of molasses were not kept.

*Native Red canes.*—21.1 lbs. cane gave 1 gal. juice; 1 gal. juice gave 1.53 lbs. sugar.

*Mixed Native canes.*—19.2 lbs. cane to 1 gal. juice; 1 gal. juice gave 1.3 lbs. sugar.

*Uba canes.*—23.7 lbs. cane to 1 gal. juice.

*No. 33 canes.*—20.75 lbs. cane to 1 gal. juice.

*Mazeras Ribbon canes.*—First ratoons:—

(a) 21.4 lbs. cane to 1 gal. juice.

(b) 21.17 lbs. cane to 1 gal. juice.

“ B.”

Estimated areas of land suitable for sugar cane growing in B.E.A. :—

	ACRES.
(a) Tana River Valley ... ..	241,000
(b) Sabaki „ „ ... ..	20,000
(c) Juba „ „ ... ..	50,000
(d) Voi Swamp ... ..	1,500
(e) Kibos and Kibigori ... ..	10,000
(f) Kibwezi District ... ..	2,300
(g) Donyo Sabuk District ... ..	2,950
Total Acres	327,750

R. V. VERSTURME-BUNBURY.

## SISAL.

**S**ISAL Hemp is a fibre of considerable industrial importance, and is derived from the leaves of the *Agave Rigida* and, probably, also from a few other species. The name Sisal was applied to the fibre since it was originally exported from the town of that name, which is near Merida, the capital of the State, and the great centre of the Yucatan Fibre market. ORIGIN.

It is usually supposed that Sisal thrives on poor and rocky land, but experience shows that while it will grow almost anywhere, poor soil is not congenial to the growth of a large full-sized plant, while sisal grown on good land has a longer and more flexible fibre. SOIL.

The plant is not adversely affected by hot seasons, in fact it appears to benefit by a humid heat. Long drought, although delaying the plant, cannot stop its growth. Rainy seasons do not injure it, nor is it seriously affected by cold: in fact it seems to grow anywhere except in standing water. CLIMATIC INFLUENCES.

So far, no disease or beetle has been known to attack the plant in East Africa, though I understand there is a beetle in Mexico that injures it.

Sisal can be propagated either by bulbils, which are the flower of the plant, or by suckers. The suckers sprout from under the parent plant, and are the most commonly adopted means of planting out sisal, as the plants mature at least six months earlier than those grown from bulbils. PROPAGATION.

The leaves are ready to cut three years from the date of planting, and one cutting can be obtained each year until the plant is six years old, when it poles and dies.

Sisal is planted out in squares, about 1,000 plants to the acre, and as between 175 and 200 leaves may safely be expected from each plant, and each leaf should average .05 lbs. of fibre,  $3\frac{1}{2}$  to 4 tons of fibre to the acre may be reckoned on.

The cultivation of Sisal was started in the Highlands of British East Africa by Messrs. Swift and Rutherford of Punda Milia, who obtained bulbils from HISTORY OF PLANTING IN B.E.A.

German East Africa in the middle of 1907. In September of that year the Germans stopped the export of sisal bulbils by imposing an export tax. But our Government had already a number of plants established on their experimental farms, and with the help of the sisal growing on Punda Milia they were soon able to supply settlers with suckers for many projected plantations. It is estimated that there are now 10,000 acres under sisal in the Highlands alone, and nearly as much again at the Coast and in the Low Veldt. There are still vast tracts of land suitable for sisal yet awaiting development.

#### SELECTIONS.

When selecting a farm with a view to planting Sisal, it would be well to remember the following points :—

#### PLANTATION SITE.

As a tramway has to be laid through the whole plantation, steep hills and deep gullies should be avoided. The factory should be central and lower than the plantation, so that the full trucks can be run down by gravitation.

A permanent stream of water is essential. This does not mean that one requires a river on the farm; a stream delivering one hundred thousand gallons per hour in the dry season is ample. After the surrounding land has been under cultivation for a year or two, the flow is increased.

Electric power appears to be the most suitable for a Sisal Factory. As British East Africa is well provided with falls capable of developing power, the prospective planter should endeavour to select land with water power facilities. Otherwise charcoal, gas, or steam will be required, and all of these will require timber. Oil engines are used on some plantations, but they would prove expensive if the plantation were any distance from the railway.

The cost of transport is about one shilling per ton per mile, so that the nearer the estate is to the railway, the better.

The quality of labour is improving every year, and this is enabling estates to reduce the costs of supervision. Sisal machinery is also being considerably improved with this end in view.



A sisal plantation turning out 650 tons per annum, LABOUR, which is well within the capacity of one decorticator, can now be run with an average of 350 labourers per day, and as time goes on this number may be reduced. Should the Government start a Labour Department, and distribute labour fairly all over the country, sisal growers will have little to fear wherever they live; but at present those near the native reserves find labour easier to obtain than those further off.

Appended are an Estimate of Expenditure for the first period of four years of an eight hundred acre plantation, a Balance Sheet drawn at the end of the fifth year, and a Trading Account for the fifth and subsequent years.

The expenditure is estimated on a very liberal scale, and no allowance is made for revenue derived from catch crops, such as beans, peas, maize, etc., which may be profitably grown between the young sisal for at least one season and possibly two.

#### ERRATA.

Line 23, Page 32, should read:—a stream delivering twelve thousand gallons

company,  
managed estate is distinctly a conservative estimate.

The intending sisal planter should be prepared for a capital expenditure of £20,000, although it is safe to assume that after expending £12,000 the balance might be obtained on mortgage.

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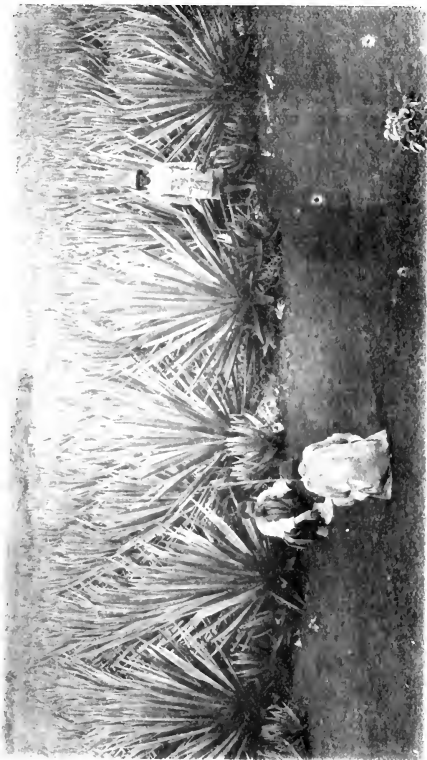
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It will be noticed that 800 acres are suggested as **OUTPUT.** a unit for a sisal plantation, and that the output over three years is stated at from  $3\frac{1}{2}$  to 4 tons per acre. But as it is necessary to allow the land to lie fallow for twelve months after the last cutting before re-planting, I have taken only 600 tons as the annual output, which in the case of a properly equipped and managed estate is distinctly a conservative estimate.

The intending sisal planter should be prepared for a capital expenditure of £20,000, although it is safe to assume that after expending £12,000 the balance might be obtained on mortgage.

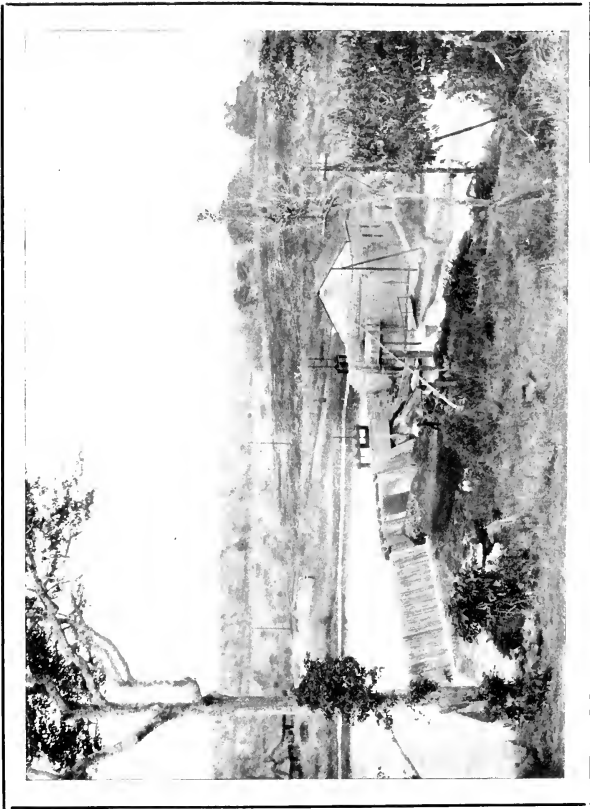
## ESTIMATE OF EXPENDITURE FOR THE FIRST PERIOD OF 4 YEARS.

	1st year.	2nd year.	3rd year.	4th year.	TOTALS.
Acreege planted each year	200	200	200	200	800
Land. 3,000 acres at Rs. 30 per acre	Rs. 90,000	Rs. ...	Rs. ...	Rs. ...	Rs. 90,000
Clearing, Ploughing and Planting	9,000	10,000	11,000	12,000	42,000
Manager's Salary	5,400	5,400	5,400	5,400	21,600
Clerk and Store-keepers	1,800	1,800	1,800	1,800	7,200
Secretarial Expenses	3,000	2,200	2,800	3,000	11,000
Other Wages	1,500	600	1,000	1,500	4,600
Engineer	...	...	...	3,600	3,600
Houses and Buildings	15,000	...	...	6,000	21,000
Implements, Tools, Waggon	3,000	...	...	3,000	6,000
Oxen	2,500	...	...	5,000	7,500
Factory and Accessories	...	...	...	80,000	80,000
	131,200	20,000	22,000	121,300	294,500
Depreciation	...	1,875	1,875	1,875	5,625



*Photo by W. D. Young.*

**SISAL.**



*Photo by W. D. Young.*  
**POWER STATION FOR GROUP OF SISAL FACTORIES AT THIKA.**

## BALANCE SHEET.

AS AT THE END OF THE FIFTH YEAR.

**LIABILITIES :—**

Capital a/c. ... .. Rs. 294,500

**ASSETS :—**

Land at Cost, 3,000  
acres @ Rs. 30  
per acre ... .. 90,000

800 acres of Sisal  
at Cost plus  
salaries and wages  
and depreciation ... .. 95,625

Buildings at Cost Rs. 21,000

Implements, etc. 6,000

Oxen ... .. 7,500

34,500

*Less* Depreciation 5,625

28,875

Factory, etc., at cost ... .. 80,000

Rs. 294,500 294,500

### ESTIMATE OF TRADING ACCOUNT FOR FIFTH AND SUBSEQUENT YEARS.

**RECEIPTS :—**

600 tons @ Rs. 300 per ton on rail Rs. 180,000

**EXPENDITURE :—**

Maintenance of Plantation ... Rs. 12,500

Factory Wages ... .. 24,000

Other ,, ... .. 2,000

Manager's Salary ... .. 6,000

Engineer's ,, ... .. 4,500

Clerks, &c. ,, ... .. 2,000

Secretarial Expenses ... 3,000

Repairs and Running Expenses 8,000

Renewal Fund ... .. 12,000

74,000

Rs. 106,000

Equivalent to 36% of the invested capital.

Under the system outlined for the fifth and subsequent years, the value of the assets would be maintained in perpetuity at the value shewn in the fifth year's balance sheet.

F. C. ALLSOPP.

## PIG BREEDING.

### HISTORY.

ALTHOUGH from the earliest days of European settlement in the Highlands, pig-breeding was generally recognised as offering great possibilities, it was not until some ten years ago that a genuine effort was made to start the industry on a sound foundation. In 1906 the first importation of high class stock was made by Government, Lord Delamere, and Major—then Captain—Grogan, with such satisfactory results that further importations were made by other settlers at various times.

Despite losses from periodic outbreaks of swine fever in different parts of the country, and lack of success on the part of many through inexperience, the industry steadily developed, and as early as 1911 bacon was exported to England from East Africa realising within two shillings per hundred-weight of the best Danish.

### FACTORS FAVOURING SUCCESS.

That the climate of the Highlands is favourable to the raising of pigs has now been clearly established. The total absence of winter conditions favours early maturity, while doing away with the necessity for expensive buildings.

Foodstuffs of various sorts are abundant and inexpensive and also easily and cheaply grown.

The natural grasses, supplemented by a small allowance of grain per day, provide all the food required by the sows when they are not suckling young.

When pigs are run in large numbers it is advisable to plant up areas of lucerne, sweet potatoes, maize and other pig foods, so as not to be dependent on a fluctuating market.

If a dairy is run in conjunction with pigs, skim milk can be fed to weaners, and so carry them over the period when pigs in this country require most care and are most likely to go back.

To make pig fattening a profitable business, care should be taken to see that from birth to factory the



pig is not allowed to deteriorate in condition, and the fattening process should be begun at birth, through the medium of a carefully fed mother, and carried on up to the time of execution without cessation.

Much time and money is wasted by weaners being sent out to graze, and being allowed to subsist entirely on what food they can find in the swamps and on the land, whilst they are supposed to be gaining size !

AN UNPROFIT-  
ABLE PRACTICE.

Probably twice the money saved, is afterwards expended in overcoming the setback the pig has received by such treatment, in the early stages of its existence.

Diseases are few, and those there are may be guarded against.

Local markets provide a ready outlet for a large proportion of the present output, while arrangements are being perfected for export trade, when shipping conditions become more normal.

That overseas markets are capable of absorbing all that we can hope to export for many years to come requires no argument to prove, and that we can place our products on those markets at a readily saleable price, leaving a reasonable profit for the producer and shipper, has already been clearly demonstrated.

Undoubtedly the most serious obstacle to the success of the industry is the presence in the country of a virulent type of swine fever; indeed it may safely be said that this is the one serious danger the farmer has to contend with. Considerable success, however, has already attended the efforts of the Veterinary Department to keep this danger under control, and although a serum has not yet been found to immunize pigs against this disease, it is not beyond the bounds of possibility that one will be discovered in the near future.

DRAWBACKS.

Wild pigs, although themselves believed to be immune to Swine Fever, are supposed to communicate this disease to the domestic animal, but it has been fairly conclusively proved that there is little to fear if contact between the two is avoidable. This is best prevented by enclosing paddocks and piggeries with wire netting, and keeping both thoroughly clean and sanitary.

Pneumonia has also been responsible for occasional losses, no doubt as the result of damp sleeping accommodation during the heavy rains, but measles which is so prevalent in South Africa does not exist here.

With the exception of the above named, which it is in the power of the breeder to take precautions against, pigs are singularly free from disease, and the breed is subject to no greater risks than in the home countries.

#### THE BEST BREEDS.

After numerous experiments with different breeds on the part of the Government Experimental Farms and individual settlers, the Berkshire, Long Black, and Tamworth have asserted themselves as the most satisfactory, preference being given as a rule to the first two.

The White Yorkshire was for a time considered by many to offer advantages not possessed by other breeds, but it has been found that it does not fatten as quickly as the others, possibly because of its pink skin being so readily scorched by the sun.

Too much emphasis cannot be laid on the importance of starting with really good stock. Everything depends on this and on maintaining the quality of the breeding stock by the frequent introduction of fresh blood.

A Long Black Sow (being a good roomy mother) mated with a Berkshire boar, should produce the desired result.

#### FACTORIES AND AVAILABLE MARKETS.

As far back as 1908 a factory, replete with modern equipment, was erected at Uplands, about mid-way between Nairobi and Naivasha, for the purpose of stimulating interest in the industry, in addition to which other factories on a less ambitious scale have been established in different parts of the country.

The smaller factories at present concern themselves solely with supplying the local markets, but the Uplands factory is more particularly interested in the establishment of an export trade, and has already opened up relations with England, South Africa and India.

That the readily available markets are more than capable of absorbing the extreme limit of supplies likely to be forthcoming from B.E.A. for very many years to come, is unquestionable: indeed it is not going too far to say that the tendency will be for Britain to rely more than ever, in the future, on the Colonies for her supply of bacon products, and the exceptional advantages enjoyed by British East Africa for pig-breeding should place her in a very favourable position.

One of the most hopeful features of pig-breeding in B.E.A. is that the cost of production is very low, probably as low as in any other country where pig-breeding is an important industry. COST OF PRODUCTION.

The rich grazing found all over the Highlands, supplemented by a considered allowance of maize, barley, potatoes, etc., provides excellent and comparatively inexpensive feeding.

Maize, barley, potatoes, rape, kale and lucerne can be cheaply raised, and in the dairying centres there are in addition the usual bye-products.

The equable climate obviates the necessity for elaborate housing accommodation, the principal items of expense being sound thatch roof, floors and fencing.

To produce a bacon pig of 200 lbs. weight worth 25 cents per pound live weight (which price is laid down as a fair figure for factories to pay the breeder), the cost should not be more than Rs. 32/- per pig, taking into consideration labour and general expenses. This leaves a profit of Rs. 18/- (£1 4s.), which shows a return per annum of approximately 50% on the capital it is necessary to expend; in that the capital can be turned over twice in the same year by rearing and fattening two litters from the same sow in the twelve months, or by purchasing weaners. RATIO OF PROFIT.

The Pig-breeders Association of B.E.A. has been formed, and has been well supported by breeders, so that the future of the industry, fostered by a body of this sort, should be assured. CONCLUSIONS.

Pig breeding and fattening, if given the attention it requires, should be one of, if not the most, lucrative and prosperous industries of the country. Any farmer who is prepared to treat pig breeding as an important industry, and not, as in a great many cases, as an unimportant side line, should with care and attention to the feeding of his stock, be able to make not merely a living out of them, but a fortune of no small magnitude.

My remarks on paying attention to stock and feeding apply to all branches of stock breeding, but in the case of pigs the utmost care and attention are indispensable to success.

J. B. LLEWELLYN.

## POULTRY FARMING.

**P**OULTRY farming is slowly but surely advancing in B.E.A.

RECENT PROGRESS.

I come in touch with poultry farmers all over B.E.A. and Uganda, and am of the opinion that poultry farming as a paying proposition has made decided strides during the last two years, and has completely recovered from the temporary setback it received at the beginning of the War. This condition arises partly from the difficulty of importing birds. Three years ago a bird cost about 5/- to import, whereas now it will cost between 12/- and 15/-, even when importing a fairly large consignment, and even then it is very doubtful whether the birds will arrive safely. This difficulty has caused would-be purchasers to depend much more on local production. This has resulted in a small "boom" in country bred stock, especially in the more popular breeds, such as White Leghorns, Rhode Island Reds and Buff Orpingtons. There is also a good demand for Turkeys and Ducks, but apparently, there are very

few pure bred birds of either of these breeds in the country, and Turkeys are, unfortunately, being very inbred.

There are several factors detrimental to the B.E.A. Poultry Fancy. The chief is the lack of a Poultry Club. There was a Club formed, but it is lying dormant, very dormant. It was shelved owing to the outbreak of War, but if all the many Associations, etc., which have been formed during the last eighteen months can flourish, surely it is time the Poultry Club was resuscitated. The Club, well worked, would give immense impetus to the poultry fancy. It would put members in touch for the exchange of ideas, also for business. Then again, experienced breeders would give the benefit of their knowledge to the assistance of the inexperienced breeder. The result would be better bred birds in the country and better business methods.

VALUE OF A  
POULTRY CLUB.

Of two other obvious deterrents to progress, one is caused by the professional poultry farmer, (*i.e.*, one who breeds poultry in the hope of making reasonable profit), the other by the novice.

The mistake very often made by the professional poultry farmer is the lack of systematic breeding. By systematic breeding, I mean breeding with a definite object in view, either colour, form, or egg producing qualities, or a combination of all. In B.E.A. the selection of the breeding pen seldom receives the careful study, both singly and collectively, necessary that the breeder may know what traits to expect in the progeny. Careful selection of the birds for the breeding pen is, at present, all that is required in breeding; trap-nesting is practically unknown in B.E.A. and, except in a small way, could not possibly pay for the trouble.

This brings me to the second stumbling block. The inexperienced poultry farmer in all countries is a thorn in the side of the professional, but in this country he attains to great magnitude. Many novices when buying pure bred birds of some well-known strain offer a price we should ask for a "barn-door" hen in England, quite overlooking the cost of production (original cost of imported birds, plus losses by sickness and vermin). Poultry farming in

PROFITABLE  
PRICES.

this country will never become a paying proposition unless the breeder can realise fair prices for his pure bred stock. Say Rs. 10/- upwards for pullets, 15/- upwards for cocks, 7/50 to 10/- for sittings, and 1/25 a dozen for eating eggs on contract, or 1/50 to 2/- a dozen on small orders.

The demand for "shenzi" (native) fowls and eggs by the military authorities should make a decided scarcity of native birds. This should do something towards improving the trade in English table birds, a branch of poultry farming which up to the present shows a very small margin of profit to the dealer.

AS A COM-  
MERCIAL  
PROPOSITION.

Poultry farming as a commercial proposition, with foodstuffs procurable at a comparatively low figure, should show satisfactory returns, but unfortunately, it is an industry which is going through a very prolonged infancy. As a side branch to general farming it can be made to show a very decent profit, but as a single venture, I very much doubt that a living could be made at the present time. We are still so much at the mercy of the dreaded Cholera and Kikuyu Fowl Disease. These diseases have been responsible for considerable losses in the past, but the Pathological Department has done a certain amount of research in them and can now, I believe, inoculate the birds to make them immune for a year.

THE RIGHT  
WAY TO START.

The B.E.A. poultry farmer has to buy his experience very dearly, and it is decidedly unwise for one, if lacking experience, to lay out a large sum of money at the start. The novice who will go slowly, start in a small way, and gradually build up his flock, will score every time. For, having only a small number of birds to consider, he will be able to give each bird individual attention, thus greatly minimizing the risk of losing the whole flock by an epidemic. With experience comes the ability to rapidly overlook a large flock and immediately detect the first sign of sickness. With poultry diseases in this country time is everything, and the immediate removal of one sick bird from a flock may prevent a serious epidemic. In any serious illness it is absolutely waste of time and money to doctor a sick bird. The only safe course is to kill the bird (without drawing blood) and burn the carcase, thus minimizing the risk of the disease spreading to the rest of the flock.

The housing of the birds depends mostly on local **HOUSING.** conditions, as to whether there is, or is not, vermin, such as mongoose, serval cat, etc., in the neighbourhood. In most parts vermin proof houses, and in all parts, easily disinfected houses, are a necessity. Wooden houses are unsuitable. Insect pests under the best conditions are difficult to keep under, and to build wooden houses is to ask for trouble. Corrugated iron affords the safest house. The objection to iron is that it attracts the heat, but this can be obviated by covering the house with a grass or reed thatch. These houses can be made any shape but should never be made too large to be portable, frequent shifting to fresh ground being one way of avoiding disease. I have found a triangular shape the most satisfactory. The frame should be of cut timber, 8 ft. by 4 ft. broad at the base. Two corrugated iron sheets 8 ft. long are used either side, and one 8 ft. sheet bent in half is placed over the lengthwise beam at the top. One end should be filled in with iron, the other should have a hinged door, the peak at either end being filled in with doubled fine mesh wire netting, allowing a through current of air without any risk of depredations by mongoose, etc.

The perches should be entirely separate—straight **TO PREVENT** bars of cut timber, with rounded edges, raised about **DISEASE.** three inches from the ground by blocks fixed either end. A house of this description lends itself to easy disinfecting. Place a small quantity of damp grass down the centre of the house, well away from the joists. Sprinkle with carbolic or other disinfectant, put a light to it and close up the house and allow the grass to smoulder. This done monthly will greatly assist in eradicating insect pests, and, incidentally, to keep away infection.

Cleanliness is of paramount importance and must be carried into every department and every detail.

Another vermin proof house, and one that may **A SERVICEABLE** appeal to the poultry farmer who has the timber **HOUSE.** convenient while corrugated iron is at its present high price, can be made of poles. The poles should be let about a foot into the ground and placed close together, and covered inside and outside with wire netting. The roof should be formed of corrugated iron, or of thatch covered with wire netting.

## INCUBATING.

Incubating is carried on in B.E.A. with very varied success. The chief difficulty arises from extremes of temperature between night and day, causing great difficulty in regulating the temperature of the machine. This is a branch of poultry farming where practical experience combined with careful study is the only way to success.

## A SUITABLE INCUBATOR HOUSE.

An incubator house should be a building by itself and the best material is stone. A house to hold one medium sized machine should have a floor space of about 8 ft. square, which will allow space for the attendant and the accessories. The floor should be two feet, or even more, below the outside ground level, to prevent vibration and to keep the temperature even. The foundations should be of cut stone, two stones thick from the base to two rows above the outside ground level and fixed in cement. After this the walls can be built of small rough stones and mud, but all corners should be of cut stone.

The roof should be built on four posts, firmly fixed in the ground outside the house and not touching the walls, to avoid vibration when the wind is strong. The four posts are connected by cross pieces and from these is built a well thatched conical shaped roof of reeds, with a one in one slope. A house built in this manner will show a practically unvarying temperature, and materially contribute to the success of one's efforts at incubating.

A. M. BUMPUS.

## FLAX.

## HISTORY.

**I**T is now some 5 years since the first experiment in growing flax for fibre was made at Gilgil by the East Africa Syndicate. The results were so encouraging that after some further experiments by the Director of Agriculture at the Government Farm, Kabete, one of the leading authorities on fibres in England, was invited by the Government to visit and inspect the whole country and report on its suitability for growing this crop on a commercial scale. The impression formed by this tour may be gathered



from the fact that on his return to Nairobi this authority immediately formed a Syndicate (in which he was largely interested) to develop the industry by the erection of a factory at Lumbwa, which he selected as being an exceedingly suitable district for the crop. This factory has now been running continuously for more than two years, and the figures given later are calculated from actual results.

Present experience goes to show that the most suitable elevation for flax cultivation lies between 6,000 and 7,500 feet above sea level and it thrives on almost any soil which is not water-logged. At lower altitudes the percentage of fibre appears to be less.

The crop takes about  $3\frac{1}{2}$  months on the average to be ready for harvest, and provided it receives sufficient rainfall during the first two months from seeding, germination will be perfect and the results certain. Owing to the suitable conditions existing here, two crops can be grown in one year. The quality of the fibre depends largely on this early rainfall, as if it fails the fibre will be of a dry and harsh nature. Rainfall in B.E.A. is consistent in most parts.

Cultivation should be thorough and the soil reduced to a fine tilth.

In Lumbwa the practice is now to sow about 100 lbs. per acre, and not less. Care should be taken that good clean Russian seed should alone be used, and from Riga, Pernau or Selmev for preference. Indian seed is no good for fibre. The seed should be turned in with a light harrow, and the land rolled to a smooth surface to ensure an even growth to the crop.

Any weeding required should be done when the young crop is not more than 2 inches high, after which no attention is required until it is ready to be pulled.

It is important that pulling should be done exactly at the right time, and well-grown flax should indicate this by showing a golden colour on the lower part of the stem from which the leaflets have dropped, leaving the upper part of the stem greenish

and showing the seed capsule of a reddish yellow colour. Pulling must be done by hand and each handful laid aside with the root ends kept as level as possible. In fine weather, after two days these handfuls should be turned over, and after two days more if sufficiently dry three or four handfuls should be tied up in sheaves and stacked. When the seed is mature it is threshed out and the strand is now ready for retting. Threshing by native labour here costs Rs. 2 per acre, by hand: if done by machinery the cost would be much less.

#### RETTING.

Up till now retting has been done here in two ways—dew retting and water retting. No tank retting on the Belgian system (by which method the highest quality of fibre is produced) has as yet been adopted. The strand is now ready for the mill and passes out of the hands of the grower.

#### YIELD.

A good crop should produce at least  $1\frac{1}{2}$  tons of retted straw and 420 lbs. of cleaned seed per acre, while a really first class crop should exceed these figures by 25 per cent.

To the grower the lower of these figures, even taking the small percentage of 12% fibre and 10% tow (samples have been proved 15% in this country) means:—

For straw	...	...	Rs. 180 per acre.
For seed	...	...	Rs. 70 per acre.

Rs. 250 per acre.

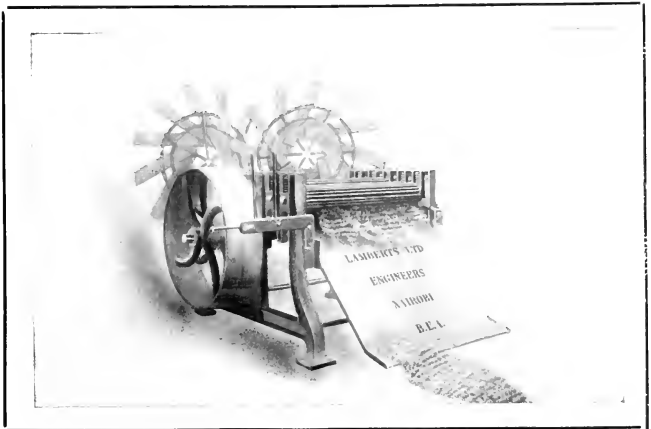
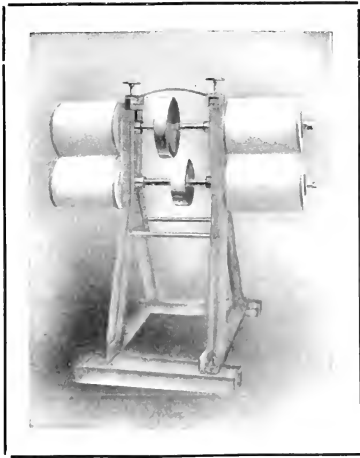
Straw is paid for by the factory at the present time at the rate of Rs. 10 for 1% of fibre.

#### COST.

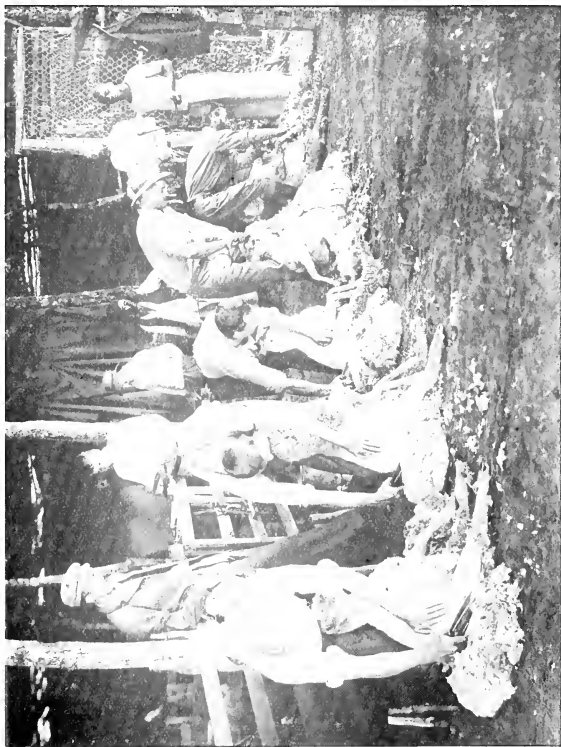
The whole cost of cultivation, including seed and all labour, until the straw is ready for the factory should not exceed Rs. 62, which leaves the very satisfactory profit to the grower of Rs. 188 per acre. The immense advantage, however, when the farmer or group of neighbouring farmers own their own mill, will be apparent from the following factory figures.

#### FACTORY.

In Belgium the usual size of factory is 40 scutch mills, and it will probably be found that this is the most economical unit of size in this country, as one



LOCAL MADE FLAX MACHINERY.



*Photo by W. D. Young.*

## **SHEEP SHEARING.**

skilled white man can look after all the work. It would deal with 900 tons of straw per annum, representing at the above rate an area under flax of 600 acres. This would probably prove a convenient arrangement for a group of 3 or 4 neighbouring farms and the factory would naturally be situated in the position that best suited the group.

The cost of such a factory erected and complete but exclusive of motive power should not exceed **COST.** Rs. 10,000. The working costs of such a factory from the entrance of the raw material to the delivery of the finished article at a London wharf—including management, labour, depreciation, stores, freight, insurance and brokerage, should not exceed Rs. 20,000 per month.

Taking London prices of flax at £180 and tow at **RETURNS.** £75 per ton—prices which have already been greatly exceeded by the local article—the income of the factory would run to Rs. 34,000 per month.

Showing a factory profit of Rs. 14,000 per month, or say Rs. 276 per acre per annum. If therefore the farmer has his own mill his combined profits work out at Rs. 470 per acre per annum. **PROFIT.**

These results can be attained only by thoroughly good farming and thoroughly skilled factory supervision.

THE NYANZA FLAX COMPANY.

## SHEEP FARMING.

**T**HE area suitable for sheep farming in B.E.A. is limited. The country is hardly big enough to run very large herds as in Australia, but small herds can be very well and profitably farmed.

While cattle can be said to do well in nearly every part of the country, the same cannot be said of sheep. So far they have been found profitable only in the Rift Valley (that is from Kijabe to Nakuru), the Loita Plains and Laikipia, Molo and some parts of the Uasin Gishu. **THE BEST DISTRICTS.**

SUITABLE  
BREEDS.

It may be taken as proved that the Merino (Robust wool type) is the most suitable breed to cross with the natives sheep; but in consequence of the advance in the price of crossbred wool, and the local demand for mutton, a number of Romney Marsh rams have lately been imported into the country.

The natives of B.E.A. have had sheep for hundreds of years, the Masai tribe at present possessing the best and the greatest numbers. The native sheep are very poor animals, but when crossed with Merino rams the results are excellent.

CATTLE AND  
SHEEP BEST.

It is advisable for every intending settler to realise that sheep and cattle must be farmed together, as the grass must be well eaten down, and grass fires be avoided as much as possible, before sheep will thrive. There should be at least 50 head of cattle to every 500 head of sheep.

EAST AFRICAN  
WOOL.

Wool from British East Africa has quite a good name on the market, and steady prices have always been obtained, the pre-war prices being from ninepence halfpenny per pound for grade wool.

Current prices are approximately as follows:—Good grade ewes 16/- each; hoggets 13/4; wethers 16/- to £1; native sheep 10/-; grade rams £2; Merino flock rams £4.

ESTIMATE OF  
COSTS.

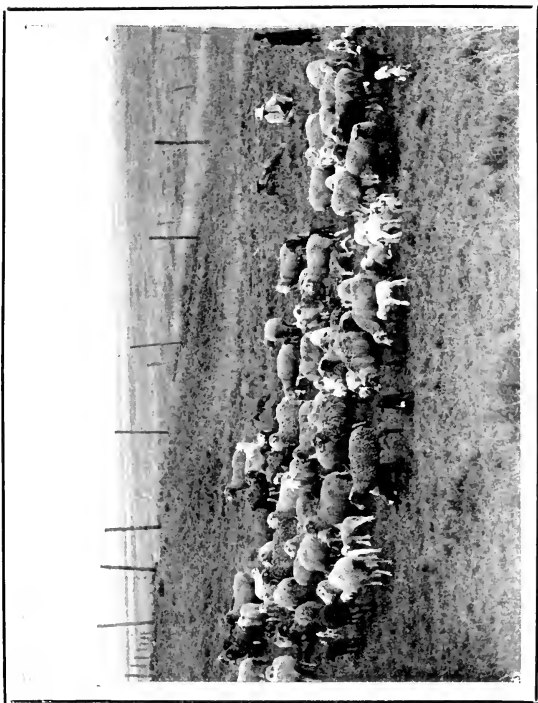
The cost of running a small flock of 2,000 head for one year should be roughly as follows:

Herds and their food	...	£45
Dips, medicines, etc.,	...	40
Shearing, repairs and sundries	...	15
		<hr/>
		£100

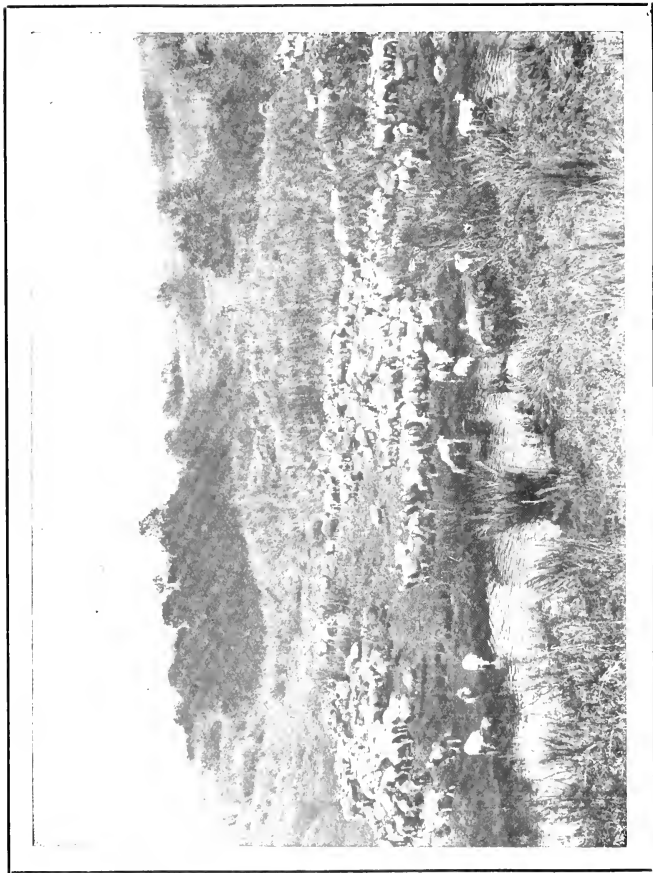
This works out at just a shilling per head per annum, not including white supervision.

NATIVE HERDS.

The natives, more especially the Masai, make good herds, and most of them make quite good shearers, their wages being from 2/8 to 4/- per hundred sheep.



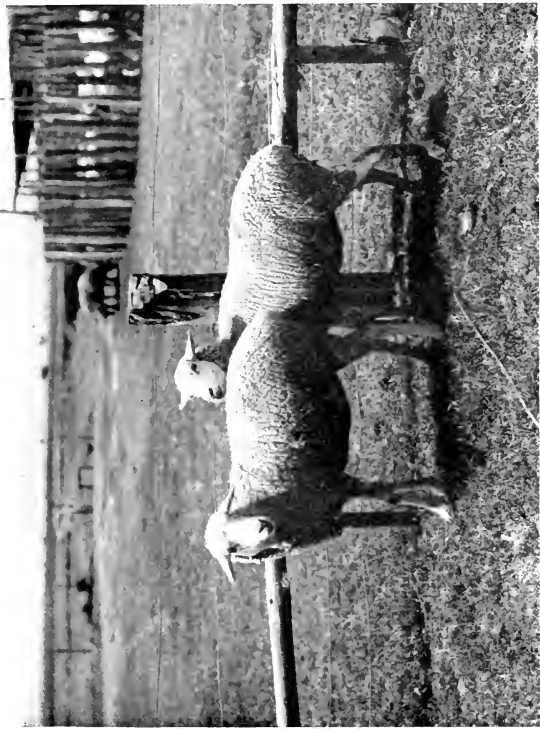
A MOB OF GRADES



*Photo by H. D. Young.*

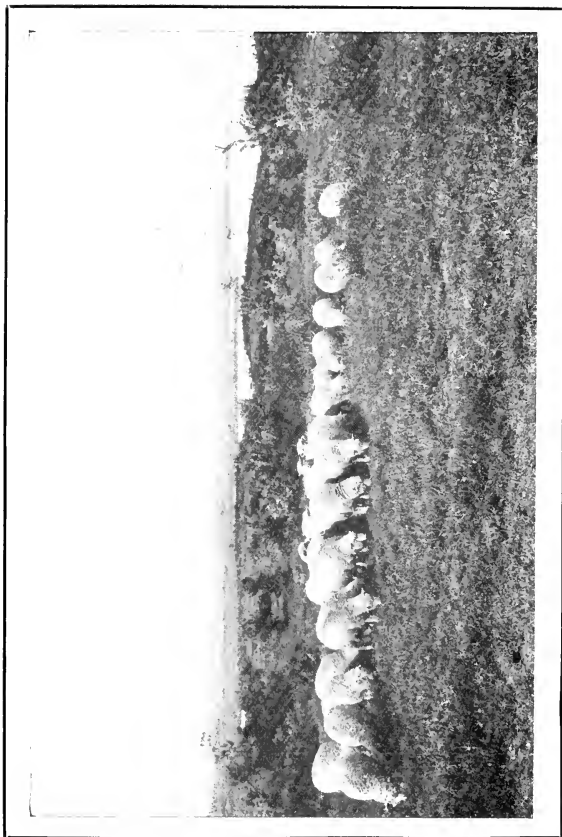
**ON LORD DELAMERE'S ELMENTEITA FARM.**





*photo by Lieut. Col. R. J. Sturdy*

**BRED AT NAIVASHA GOVERNMENT FARM.**



*Photo by H. D. Young.*

**ON A HIGHLAND SHEEP FARM.**

As most sheep farmers in the country will own, losses from disease are fairly high. A small flock, however, should not have a higher percentage of loss than 6 per cent., excluding unweaned lambs.

Wire worm is undoubtedly the worst pest farmers have to contend with, but with regular dosing and change of grazing this trouble can be overcome. Scab also can be effectually kept under by dipping. Foot rot, which is rather bad in the more rainy parts of the country, can be greatly reduced by cutting the sheep's feet twice a year. Other diseases, such as sheep pox, can be dealt with by the inoculation of a vaccine which has been prepared by the Pathological Department. It is most important, however, that sick sheep should be isolated and be given special attention. DISEASES.

The usual time for lambing is from October to December. Shearing takes place during December and January. It has been found advisable in those parts of the country where the rainfall is heavy, to shear the lambs about seven to eight months after they are dropped, as the carrying of a heavy fleece for many months over that period pulls down the sheep very much in condition. LAMBING SEASON.

Every sheep farmer must have a small dipping tank, either one of Cooper's portable swim baths, or one of stone or cement. IMPORTANCE OF DIPPING.

In no part of the country has it been found necessary to shed sheep. For bomas, those constructed of bush or hurdles that can be easily removed, have been found most suitable.

Since the inception of the Government Stock Farm at Naivasha, sheep have been given considerable attention there, and the progress made is evidenced by the attached extracts from the Manager's Report for 1915-16. GOVERNMENT STOCK FARM, NAIVASHA.

"We have many varieties and grades of sheep on the farm, including pure Merino and pure Suffolk, grade Merino, grade Lincoln Merino, grade Down Merino and grade Welsh Merino. We have the

above up to the 6th and 7th crosses, and the wool of the higher grade merino is equal to a great deal of pure Merino wool and is well reported upon by our London Agents.

The Suffolk crosses give a very nice mutton animal and the demand for rams of this grade was very marked at the last Annual Sale.

**MUTTON  
CROSSES.**

The stud ewes and rams purchased from Messrs. Faulkner and Sons, Boonoke, have bred excellently, and we have reared some very nice rams and ewes from the importation, which are now pure Boonoke blood but bred in East Africa.

**E. A. WOOL  
PRICES.**

The clip was good, the weight of fleece per animal being about the same as previous years. The report on the clip was very satisfactory, and the prices obtained were very good, considering the times, being 11d per lb. for pure Merino ewe fleeces, 10d. and 10½d. per lb. for grade Merino fleeces.

These prices pay us very well and compare favourably with those obtained by any other country.

Our shearing costs from five to six shillings per hundred animals, while the cost is much higher in other countries: indeed the general labour expenses in connection with sheep and shearing are much cheaper here than in many places, while the increase here is as good and in many instances better.

**VALUE OF  
SALT.**

For the welfare of a flock I believe in plenty of salt, and I am now inclined to think that sheep want a little lime and I am also of this opinion re cattle.

The sheep on the farm are certainly an eminently paying proposition, taking into account the wool increase and sales of sheep.

**MEDICINES.**

I find that the pure Merino sheep and pure bred lambs are just as hardy as any of the grades. As regards dosing, I have used the same as in previous years, that is, Cooper's powder sheep dip and salt, and Cooper's powder sheep dip and bluestone; the latter in liquid form and the former in dry state. All sheep treated are fasted for 20 to 24 hours previous to dosing.

None of the stock have been pampered or kept in a way that a private person could not do. All the pure bred stock, both cattle and sheep, are out day and night all the year round, that is, they are grazing all day and are in bomas of wire without any covering at night. **NO STOCK PAMPERED.**

Among ewes the general deathrate was low, but as regards grade lambs it was higher this year than usual, and much higher than in the pure Merino lambs

To the pure Merino rams during the tupping season I always give a feed of crushed maize. I am also a believer in giving young Merino rams in this country a little feed of some kind—lucerne or crushed maize—and in grazing them out all day. I find they do ever so much better when treated in this way; the feed being discontinued at a later date and resumed at tupping time.”

The beginner would be well advised to buy good ewes of strong constitution to start with, and to spend a short time on a sheep farm, especially during shearing, before moving on his own. At the start the beginner is bound to have some losses, but he will find that as soon as his flock has got acclimatized to his farm, sheep are undoubtedly one of the most profitable branches of farming in British East Africa. **SOUND ADVICE.**

A BREEDER.

## TEA.

### STILL AN EXPERIMENT.

TEA cannot yet be regarded as among the products that have proved themselves commercial propositions in B.E.A. Nevertheless, experiments have proved that in parts of the Highlands the soil and climate are favourable to its growth, and several schemes are on foot to lay down plantations.

As far back as 1903 an experiment was undertaken at Limuru by the late Mr. G. W. L. Caine, who had considerable experience of tea in India, and in the following year an area of two acres was planted out with plants raised from seed of the Manipur hybrid variety. Unfortunately a break in the rains just after the transplanting resulted in the loss of many of the plants. Notwithstanding this, some 500 healthy, luxuriant trees of the original experiment are still flourishing, and may be taken as evidence of what could be done with the tea plant in the district.

### FAVOURABLE REPORTS.

Samples of this tea sent home to the Imperial Institute were reported on by Professor Wyndham R. Dunstan, M.A., F.R.S. The results of an analysis shewed that it resembled Indian tea in the amount of extractive matter and tannin present. The liquor obtained on infusion was found to be of very fair quality, and the tea was valued by a firm of brokers at from 6½d. to 7d. per lb. "The investigation shews," concluded Professor Dunstan in his report, "that tea of good saleable character can be grown in the Limuru district of the East Africa Protectorate with prospects of success." Again, in 1911, two samples were sent home, and were favourably reported on by a firm of tea experts, the teas being valued at 8d. and 8½d. per lb.

### PROSPECTS OF SUCCESS.

From this it is evident that only further experiment is necessary to establish tea as a paying investment in British East Africa. But the process may be slow, as it is not an undertaking that can be embarked on by the inexperienced, and the difficulties of obtaining seed are a hindrance.

Tea seed rapidly loses its vitality, so that rapid transit is essential, and it must be planted immediately on arrival at its destination. The nurseries should

be well prepared, with facilities for irrigation or hand watering. The seed should be planted two inches deep: otherwise the preparation and sowing are as with coffee. The young bushes should be ready to transplant in from 10 to 18 months, the best distance for planting in the Limuru district (owing to the luxuriance of growth) being eight feet by eight, or even nine by nine. Planting should be done only in cloudy weather when the ground is moist and rain is imminent. Virgin forest land is the most suitable.

PLANTING  
METHODS.

The tea bush differs from other evergreens in this important respect—that whereas with coffee and citrus trees there are distinct harvesting seasons, it is not so with the tea bush. It bears leaf and requires plucking all the year round. The pruning of the tea bush is naturally quite different from that of coffee—in the former one prunes to get a larger surface and to encourage the growth of leaf, while in the latter one's aim is to promote the growth of seed.

PRUNING.

The writer has had little experience of tea, but is satisfied that the soil and climate of the Limuru district are favourable to its production. Plants raised from seed grown on the Caineville Estate are now promising well, and it is hoped in another year to have seed available for sale. While it is yet too soon to say whether plants raised from locally grown seed will prove superior to the original importation, for local planting it has been well proved that such is the case with other plants.

SEEDS  
SUPPLIES.

There are other districts than Limuru in the Highlands of B.E.A. suitable for the cultivation of the tea plant, so that the prospects of the industry well deserve attention. The late Mr. G. W. L. Caine estimated the cost of clearing and planting 300 acres and maintaining up to the 4th year, including necessary buildings and machinery, but not including the cost of the land, at £7,500, or £25 per acre.

CAPITAL  
REQUIRED.

W. H. CAINE.

## PLANTING IN UGANDA.

### HISTORY OF THE INDUSTRY.

THE history of the industry on a commercial scale dates back to 1910, at which time there was only one European estate in the country. In that year, mainly on the results obtained on this single estate, Europeans commenced to take up land and turn their attention to the possibilities of planting.

Previous to this, in fact as early as 1901, experimental planting of Para, Castilloa and Ceara rubbers, cocoa and coffee were made by the Government in the Botanic Gardens, Entebbe. Castilloa and Ceara rubbers were soon shown to be unprofitable crops, but the success promised by Para rubber, cocoa and coffee engaged the attention of those pioneer planters, Messrs. Hunter and Moses in 1906, and they started the first European estate in the country which is at the present time under the Kivuvu Rubber Co., Ltd.

### CAPITAL INVESTED.

From this date until the outbreak of war there was a considerable influx of planters and capital into the country, and it can now be safely said that there are more Europeans engaged in planting than in any other industry. The capital now at stake also far exceeds that of any other industry. There are to-day at least 150 estates owned by Europeans. These vary from 100 to 2,000 acres of cultivation and probably represent a capital of over half a million sterling.

### EARLY EFFORTS.

The first plantation company was started as a rubber growing concern, but the success it met with in growing coffee as a catch crop between the rubber, induced it and most planters who followed it, to make coffee their principle crop. How unfortunate this was will be shown later, but there is no doubt that the very fine yields which were obtained, coupled with the good prices realised in the market, justified planters in doing this. After all, at that time, rubber was not proved, moreover, it was not expected that any return was possible from it for six years, and here was a crop which came into bearing at two and a half years, and from which planters were actually making very good profits.

### DISEASE APPEARS.

In 1913 leaf disease, *Hemeleia vastatrix*, made its first appearance and put at entirely different



complexion on coffee growing. The disease was REDUCED epidemic at its first appearance and when its viru- YIELDS. lence had passed off it was followed by several other pests in epidemic form until to-day, such is the toll exacted by these pests, that average yields per tree are nearer  $\frac{1}{2}$  lb. than the  $2\frac{1}{2}$  lbs. we got previous to 1913.

Some districts in Uganda seem to have escaped the ravages of the pests to a large extent, and probably give a higher yield, and even in the worst affected districts one estate here and there will have a good year, but on the whole I fear our yields will never approach the pre-disease figures.

At the same time that the yields began to decrease prices in London began to drop, whilst the war came as a crowning misfortune with its high freights and uncertain markets.

Fortunately, the rubber planted before the coffee DEVELOPMENT boom had by this time reached the tappable stage, OF RUBBER. and the three years' results of yields and costs which are given later on, show that this is an even better paying crop than coffee ever promised to be. Those who have continued to plant and keep up their rubber are now about to reap a rich reward for their faith.

Cocoa all this time was being steadily planted. COCOA. It never excited the attention that coffee did, nor, on the other hand, was it neglected for coffee as rubber was. All planters seemed to regard it as a good second to coffee as an investment. Cocoa has, however, still to prove itself as a profitable crop.

In the Kingdom of Uganda practically all the LAND. land is in the hands of the natives. Purchase of this land was possible by agreement with the native owner and the Government, who took the land over from the native, and retained possession, until the purchaser had completed the development of 10% of the acreage. A freehold title was then given by the Crown. Government land in Bunyoro, Toro and Busoga was obtainable similarly. Prices in the case of native land were a matter of arrangement between the seller and the buyer. In 1910 the average price was Rs. 2/- per acre, which rose rapidly to Rs. 30/-

and over during the coffee boom. After 1913, however, the demand for land dropped and prices fell considerably.

#### NEW TITLES.

Recently information has been received that the Secretary of State has ruled that no more freehold grants of land are to be made and the Governor is unable to sanction any further sales by natives to Europeans. All that can now be got is a lease up to 99 years with two revisions of rent during the period.

The reason for this change is unknown, but as there is considerable opposition to it amongst all sections of the community, and not least amongst the natives themselves, there is a faint hope that it may be given up. Of its effect on the development of the country there is no doubt.

#### ABUNDANCE OF LAND.

There is abundance of land suitable for planting in the Protectorate. Vast areas are almost uninhabited or occupied only by the owner and his family. An infinitesimal proportion is cultivated by the natives.

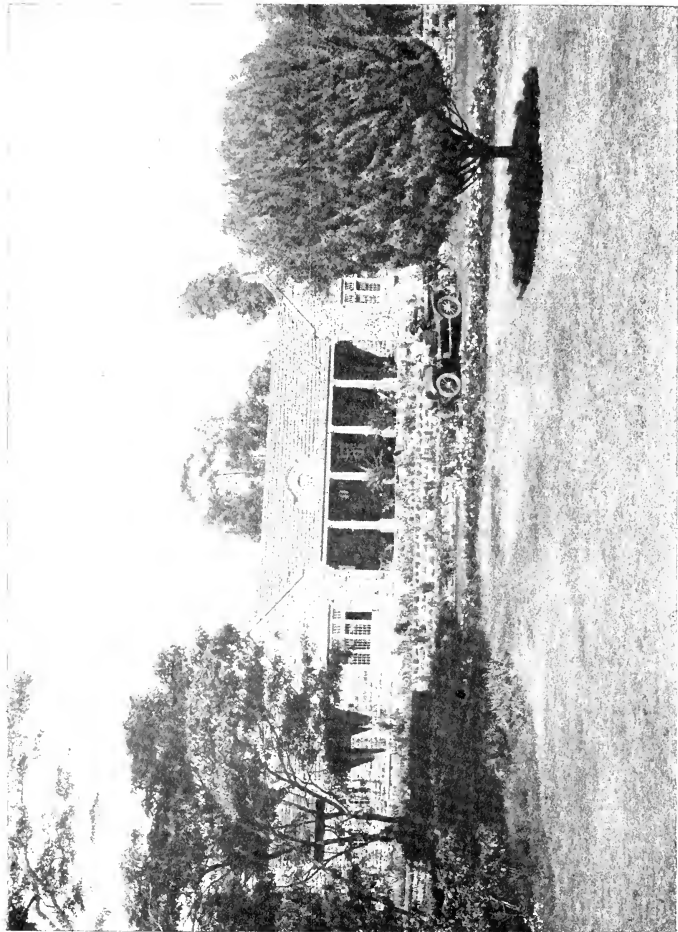
The only crops which have been successfully grown by Europeans are rubber, coffee and cocoa. Attempts have been made with cotton, tobacco and other crops, but with little success. All the cotton which is produced in Uganda is grown by natives on the extremely wasteful plan of a cotton plot for every person regardless of the suitability or otherwise of the locality. The Government controls the production of the crop and spends a good deal of money on it. The Agricultural Department may be said to be mainly occupied by this one crop.

#### RUBBER DISTRICTS.

Of the three crops which Europeans are growing, rubber may be said to offer the best prospects, and it is rapidly becoming the favourite crop. The oldest rubber is in Kyagwe, which is the district with the heaviest rainfall. Still, rubber is doing well in Busoga, Mityana and Masindi, and there is no reason to fear it will not do well over most of the planting districts.

Coffee, as I have already mentioned, is not the safe crop it was expected to be. Despite this, a good





*Photo by W. D. Young.*  
The Site of "Tentfontein" 1917 now "Chiromo" the East African home of W. N. McMillan Esq.





**"TENTFONTEIN", NAIROBI. 1904.**

One of the earliest parties of pioneers from South Africa. The group includes the late W. Russell Bowker, Mrs. Frank Watkins, N. A. McGregor, Esq. (Manager Naivasha Govt. Farm) and V. M. Newland Esq., (Managing Director Newland, Tarlton & Co., Ltd.)

*Photo by H. D. Youngs*

deal of coffee is still being planted and fair crops are being secured in districts further from the Lake. It is, however, extremely likely that the epidemics which did so much damage to the crop in the Lake area will sooner or later spread to these more remote parts, when prospects there will be less bright.

COFFEE  
PROSPECTS.

The safest and best system of planting seems to be the planting of rubber, using coffee as a catch-crop. This plan was advised by the writer in his book "Planting in Uganda" some years ago, and events have proved that had the plan been more generally carried out, many planters would have had reason for rejoicing now. We have found that rubber must be planted at a minimum distance of 20ft. by 20ft. Were no catch-crop grown the upkeep of the areas would be very expensive, and coffee seems to be the best crop to use for the purpose. It must all be removed by the sixth year, and with average luck two or three fair crops may be secured in the meantime to help tide over the period of waiting for the rubber. Should pests be too prevalent to allow of even fair crops, then the coffee has helped to keep the land clean, and it is comforting to know that one's main crop is not the one that is affected, nor is there the slightest reason to fear that the coffee pests are capable of attacking the rubber.

THE BEST  
SYSTEM OF  
PLANTING.

Cocoa is not yet mature in the country. Government have a few old trees in Entebbe which are said to give very good crops, and had the yields from these been recorded, probably we might have been in a position to say definitely whether the crop was going to be a success or not. Unfortunately, no records of yields were kept, and the planters have to wait until they have proved the point for themselves, as they have done in the case of rubber.

THE COCOA NOT  
YET PROVEN.

The cost of labour is from Rs. 4-50 to Rs. 5 per month. It may be said to be fairly cheap. Most of the estates are in the Buganda Kingdom and here the local labour is very deficient, in spite of a big native population. Most plantations are being run with labour recruited from the more remote parts of the Protectorate. The Baganda are most useful for the more skilled work of a plantation, such as pruning, tapping, etc. Unfortunately they cannot

LABOUR.





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be induced to work in sufficient numbers for even this work to be carried on without check.

The labour problem is one not difficult of solution. The country is teeming with people, but until the labour question engages the attention of the Government sufficient labour will not be easy to get.

ECONOMIC  
SIZE OF  
PLANTATIONS.

Plantations of less than 250 acres are not advisable in this country. The area is about the right size to keep one European profitably employed. The climate is against the small proprietor who proposes to make a home here. The above area would pay for a manager when the owner considered it necessary to seek a change of climate.

NECESSARY  
CAPITAL.

The capital necessary to bring the areas into full bearing is: In the case of rubber, £20 per acre; Cocoa, £20 per acre; coffee, £15 per acre. With a total acreage of 250 this would cover all necessary buildings and machinery.

Were rubber planted with coffee as a catch-crop (and this is the only economical way of growing rubber), and the proceeds from the coffee used to reduce the capital expenditure on the rubber, the £20 per acre might be materially reduced. This would, of course, depend upon the crops of coffee secured, and also largely upon the market.

A planter experienced in the crops of this country might reduce the above figures, but it is not safe for others to count on doing so.

BEARING  
STAGE.

The coffee would be in full bearing at three years from seed, Para rubber would commence to bear in five years, but would not be giving large returns until the eighth year. Cocoa commences to bear at five years. We have yet to prove at what age it becomes really remunerative.

I have already referred to the present-day uncertainty of the coffee yields. We got 2½ lb. of parchment coffee per tree before leaf disease came. Some estates get this amount now, but not regularly, year after year, as we used to. Many estates rarely get a good crop so that it is very difficult to give any

figure which can be said to be fair. Personally, I would say that an average of  $\frac{1}{2}$  lb per tree is as much as can be relied upon.

Pests are becoming increasingly abundant. Our most serious pests are: Leaf-diseases, Berry-blotch Bean-fungus, Variegated-bug, Stem-borer, Berry-borer and a leaf-eating caterpillar. Any of these pests may become epidemic. Spraying is in some cases effective, but as our scientific experts tell us spraying should be used to anticipate attacks, and be considered as a preventive, and as we never know which pest is coming, one can hardly provide against all of them by spraying. Spraying measures have not yet been proved to give any real security nor are they likely to against so many different pests, until the one cure for every ill is discovered.

A good deal has been said about the pruning of coffee out here. The subject, of course, did not arise until our crops began to decrease. Yet, in our fat years, we did not get our crops by pruning. The real truth of the matter is probably that when our trees were giving us regular crops of coffee they did not run to the thick growth that they do now, when they bare sparsely. In other words, small cropping is probably the cause and not the effect. I do not for a moment hold that our trees could not be improved by pruning, but if one considers that our reduced crops are due to pests, which certainly will not discriminate between the pruned and the unpruned, one has to decide whether an extra crop to cover the extra expense is reasonably probable. A great deal of pruning has been done with such varied results that cases can be cited for and against. The general question is decidedly "not proven."

In "Planting in Uganda," 25/- is given as the cost of putting 1 cwt. of coffee on the market. This was, of course, the rate when our crops were  $2\frac{1}{2}$  lbs. per tree. With a yield of only  $\frac{1}{2}$  lb per tree the cost will be about 40/- per cwt. With present high freights it will be probably 43/-. This figure covers upkeep, collection, preparation, freight, etc. The variable figures, which depend intimately upon the crop, are upkeep, collection and preparation.

**MARKET  
VALUES.**

Market prices are at present so affected by the war that it is difficult to give present values. In "Planting in Uganda" actual sale prices are given in detail. Since war broke out our coffee has sold as low as 50/- per cwt., whilst in a recent sale 90/- was realised. To get the true market figures we must take pre-war figures or wait till markets are again normal.

It will have been gleaned that we are not yet in the position to give very definite figures of yields, costs of marketing and prices of cocoa. The areas we have which are nearing maturity are very mixed in the kinds of cocoa planted. In recent years we have been able to practise very rigorous selection of the varieties we have sown, and consequently we look for much better results when these areas come into bearing. With the growth of cocoa in this country we have reason to be satisfied. It has yet to prove its cropping capabilities.

**QUALITY OF  
COCOA.**

Some of our cocoa has sold in London at 80/- per cwt. It has been classed equal to good Ceylon. Of the quality of the cocoa there is thus no doubt.

With rubber considerable progress has been made in recent years. We now have accurate figures of yields and costs extending over three years and I cannot do better than give in full a short paper which I read before the Conference of the Uganda Planters' Association in January, 1917, and in which these figures are embodied.

**KIVUVU CO'S.  
EXPERIMENTS.**

"This is the third year of the Kivuvu tapping experiment and the third occasion on which I have given the results obtained. The experiment commenced in 1914 with 6,000 trees and was extended yearly until in this paper I am giving the results of tapping 12,000 trees. The first year's results were comparatively poor as far as yields went, and, naturally, those considering the planting of rubber were not convinced, although it was shown that a good profit was obtained on the rubber collected. Last year's results were sufficiently good to induce many planters to look upon rubber with renewed interest, but there are still some who have their doubts as to the future of the crop. The figures

which I give now should do much to settle the minds of the doubters as to which is likely to prove the most paying crop for this country. The tapping of rubber at Kivuvu is by no means looked upon as an experiment to-day, but forms a very important part of our work. The results now begin to give some idea of the ultimate profit to be obtained from the crop.

The crops for the three years were, per tree :—

1914	1915	1916
8 ozs.	11½ ozs.	22¼ ozs.

These yields are sufficiently progressive to show that rubber is a sound commercial proposition in this country. It should be remembered that they are average yields over all trees tapped, big and small. I have not been able to keep yields separate, but I am certain that if I could have done so, our oldest trees would have been shown to yield 3 lbs. per tree for 1916. We also read in the Report of the Botanic Gardens, Entebbe, that close on 3 lbs. per tree was collected last year.

The costs per lb of rubber work out as follows : RUBBER COSTS

	1914.	1915.	1916.
	CENTS.	CENTS.	CENTS.
Upkeep of area ... ..	25.6	11.6	8.2
Tapping ... ..	19.0	15.2	11.0
Curing and packing ... ..	4.6	4.3	4.4
Upkeep of tools ... ..	1.0	1.0	1.0
Freight Kila to London ... ..	10.5	13.4	13.4
Management ... ..	6.0	6.0	6.0
Landed in London ... ..	66.7	51.5	44.0
Add all market and selling charges ... ..	9.0	9.0	9.0
Making the cost to place in the hands of the purchaser ... ..	1/0½d.	0/10d.	0/9d.

This table shows the cost of collection reduced 1d. per lb this year and also that we place the

rubber in the hands of the purchaser at a cost to us of 9d. per lb. That is to say all we get over 9d. per lb is profit.

**MANAGERIAL COSTS.**

It will be noted that I have only allowed 6 cts per lb for management. I have done this as that was the figure given in my first paper and I have kept to it to make my figures comparative. Those considering this sum too small can add to it what they consider correct.

**RUBBER PRICES.**

At the time I read my last paper rubber was fetching 2/2d. per lb in London. Since then prices have fluctuated, having risen to 4/- per lb. and dropped again to 2/5d. Unfortunately, owing to delays in transit none of this year's rubber has reached home, so I am unable to give prices obtained. We, however, sold one consignment of 1915 in February last at 3/4½d. per lb, the highest price on that day in the market being 3/6d. This consignment was described by our Brokers as a very nice sample of rubber. We may, I think, take it for granted that the year's rubber, when sold, will realise not far below the top of the market.

**PROFITS FROM RUBBER.**

We have now reached the stage when we may feel justified in working out what are the profits to be obtained from rubber in this country. For this purpose we may, I think, safely capitalise an acre of rubber at £20. This area should bear 108 trees. We have then to take an average selling price for the product, and I propose to take a fixed price of 2/ 2d. per lb. Agreeing to these figures we then find that the three years' Kivuvu results gave profits as follows: In 1914 of 16%; in 1915 of 25%; in 1916 of 54%. These figures are not estimates. They are the results actually obtained by me and I can vouch for their accuracy. They can be readily checked from the following: The area tapped at Kivuvu was, in 1916, 120 acres. The amount of rubber obtained was 16,700 lbs. On each lb. of rubber we get a profit of 1/6d.

**REDUCED WORKING COSTS.**

A glance at the table of costs will show that the reduction each year has taken place in the first two items, which are labour items. A reduction in the cost of labour means a reduction in the number of

men employed. When we consider the difficulties many estates have in getting labour, it is comforting to realise that rubber is a crop which year by year entails less labour.

There appears to be some doubt as to the time a rubber estate takes to become remunerative, so perhaps I may mention that our Magigye estate now provides some information on that point. Early in 1911 an area of rubber was planted with plants one year old from seed. Of these 50% had reached the tappable stage early in 1916. They gave, during 1916, an average yield of  $6\frac{1}{4}$  ozs. per tree which certainly places that area in the remunerative stage. I might add that this yield was obtained without supervision beyond an occasional visit by a European.

E. BROWN, F.L.S.,  
*Manager, Kivuuu Rubber Coy. Ltd.*

## WATTLE GROWING IN B.E.A.

### EARLY EFFORTS.

Black wattle seems to have been introduced into this country some fourteen or fifteen years ago, and to have been planted in various districts in the Highlands. About the earliest records we have are analysis of bark from trees planted in 1903 in the Kikuyu district and on the Aberdares, followed by others from Njoro, Londiani, Limuru, Kyambu and other places—all of which tended to shew that the percentage of tannin obtainable from B.E.A. bark was as high if not higher than from that produced in Natal and other wattle growing centres; but that the higher altitudes—from 6,500 to 7,500—owing to the greater rainfall gave the best results. On the strength of these analysis land owners were encouraged to plant up areas with wattle, and in the years 1911-1913, a considerable acreage was put under this crop.

### SETBACKS.

Then followed one of those setbacks so frequently met with in the histories of new countries. Coffee planting came to the fore and ousted wattle from popular favour. Difficulties in harvesting and disposing of the bark began to shew themselves, and while efforts to cope with these were still incomplete, war broke out, with consequent disorganisation of shipping, and increased freights, making it impossible to ship bark at a profit. As a result wattle has been under a cloud in B.E.A. during the past two years, but the writer is among those who believe that the difficulties hitherto experienced are of a temporary nature, and that when these are overcome very much more attention will be given to wattle and the happy owners of plantations will be amongst the envied ones of the land—having less trouble from disease or labour than any other branch of agriculturalists in the country.

### A SOUND SUGGESTION.

The present world-wide upheaval has been disastrous to trade in many directions, but the writer believes it will prove the salvation of the wattle industry because of having brought home to government and dependent industries a realization of the grip Germany had obtained over it, and of the necessity for producing the extract in the country of origin so as to reduce the cost to the lowest possible limits. If this is done in East Africa, as in Natal,



not only are we assured of our share of Britain's and the world's trade, but the present difficulty in regard to drying the bark is automatically solved. In such a case, who can believe that an industry requiring so little skill, labour or experience, and giving such returns, will be allowed to flag?

Since 1864 when, we are told, the first seeds were planted in Natal, how many fortunes have been made from wattle bark? And those based on five year old trees being five inches in diameter, and yielding five tons of bark per acre valued at £5 per ton. When we consider that in this country we have cheaper labour, that in five years trees are six to eight inches in diameter, and upwards of 90 feet in height, while the analysis of bark shews the percentage of tannin to be four to five per cent. higher than that from Natal—there seems no reason why fortunes should not be made in this country.

It has been stated that very little time or labour is required for wattle growing—how little is hardly realized by people unfamiliar with such a district as Limuru for instance, where it is only necessary to cut the bush close to the ground with machets or pangas, and, when dry, burn off. When the long rains have set in, pinches of seed (previously steeped in boiling water and allowed to soak for 24 hours) are planted just below the surface of the soil at distances of four and a half feet apart. Within a week or ten days the seeds germinate and shoots appear above ground and are allowed to grow to a height of two or three feet. They are then thinned out: only the strongest one to each hill being left.

For the next eighteen months it is necessary to keep the vicinity of each young tree free from weeds and bush, entailing cleaning perhaps three times in that period. Thereafter the overhead foliage begins to form a canopy that soon excludes the light necessary for other forms of plant life, and the plantation can be left until the third year, when it is desirable to further thin out alternate trees, leaving the space nine feet by nine. The bark from these thinnings is reckoned to pay the expenses of the estate to date, and the wood is useful for fuel.

During the next two or three years nature does all that is needed on the plantation, and the owner is free to take up other work.

At five or six years the trees reach maturity and are ready for stripping. The usual method is to make an incision about four feet from the ground and peel the bark well down to the root in strips. After that the tree is cut down, and the remainder of the bark of the trunk and of the thicker branches is removed, and the whole sent with speed to the extract factory. At the present time the question of the erection of such a factory is receiving the careful consideration of planters, and with it the full utilization of all the timber, which at present is only used for firewood, but has very considerable value for other purposes. It is hoped that before long machinery for dealing with all the products will be erected, and there is little doubt that when the whole is in working order, wattle growing in British East Africa will be among the industries giving the highest returns per acre for the time, labour and capital expended.

W. E. D. KNIGHT.

As a result of a visit to South Africa by the writer after the foregoing was written, it is expected that the proprietors of the extract factories in Natal will shortly visit this country with a view to the erection of a factory. In the meantime arrangements are being made to export the bark ground and pressed into bales.

W. E. D. K.

## WHEAT.

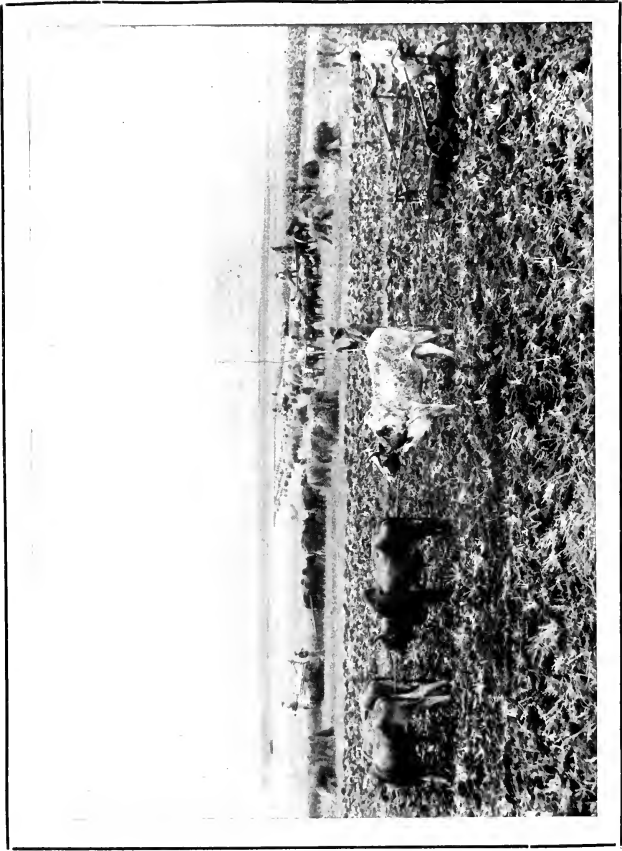
### EARLY EXPERIMENT.

Several years ago wheat breeding and testing was started on a scientific scale on Lord Delamere's Njoro estate. The writer, though he was not in the district during the early stages of the work, was on hand during the final stages and has had an opportunity of handling the seeds that were bred at this place for the last few years. He believes that the work has been of great service to the wheat industry of the country, and that a permanent rust resistant wheat has been finally obtained. The great purpose of Lord Delamere's experimental work has, therefore, been accomplished—namely, to obtain a wheat for this climate that has the characteristics necessary



*Photo by W. D. Young.*

**HORSE BREEDING AT LIMURU.**



*Photo by W. D. Young.*

**WHEAT GROWING AT NJORO.**

for a staple farm crop. In the writer's opinion this has been done, and wheat growing is now one of the many profitable crops of British East Africa.

The eternal struggle that farmers have to wage against weeds in a tropical country has also been minimized by the obtaining of a four-five months maturing wheat. In the case of wheat, as in all other lines of agriculture, we must ever bear in mind that seed selection and breeding must be practised continually, not only to keep up the grade but to improve the quantity and quality. This should not be as hard to do here as in those countries where the appearance of rust is intermittent, for here in East Africa rust, like the poor of the cities, is always with us, and we therefore have an ever-present incentive and opportunity to overcome it. RUST.

Here, more than in most other countries managerial efficiency is the main factor governing economic production of wheat. In a land of conditions very different from those most people have worked under—tropical sun, high altitude, uncivilized aborigines and stupid bullocks—one must be prepared to forget many of our home practices. Local nature is stern in demanding respect for her idiosyncrasies, and one must work in with local conditions and not against them. FACTORS OF SUCCESS.

There are several fundamental factors to which one should give mature consideration before plunging into wheat farming in East Africa. On the other hand there are several good reasons why one may regard wheat farming as a "sure thing" and likely to remain so for some years to come. Its most obvious advantage is that the local market provides the farmer with a ready outlet for his product. Wheat farming with us is entirely extensive farming. For the man who likes to fiddle time away in a light easy job, content with light work and small returns, it holds no attraction or profit. But for the man who glories in breaking-in nature to his ends on the big open plains with relentless plough and harvester, wheat farming has a deal in store.

Coming down to practical considerations, different factors to be taken into account by the prospective wheat farmer are dealt with in the following paragraphs.

**TOPOGRAPHY.**

The land should be fairly level or gently rolling, to facilitate the use of machinery. The cost of production, and consequently the nett return received, being materially influenced by the extent to which modern machinery can be used, close attention should be given to this point.

**RAINFALL.**

A rainfall of not less than 30 inches, properly distributed to facilitate seeding and harvesting, is generally considered necessary to successful crops. This is not difficult to find in those parts of the Highlands where wheat is grown, so that the farmer has little to fear on this score.

**ALTITUDE.**

So far very little wheat has been grown on lands lying below 6,500 feet. Up to now it appears to do best at about 7,000, but it is claimed to do well at altitudes as low as 5,000 feet, and the area of production is steadily spreading to districts which a few years ago were not considered suitable for wheat.

**SOIL.**

The soil should be of a loamy nature with good drainage, so that machinery can be handled to the best advantage, and with a goodly amount of humus to hold moisture and be warm enough to equalize the temperature between day and night, for the wheat to make the best growth. There should be enough available plant food in the soil to readily effect full plant and seed development, but a surplus of 'available' plant food may cause too much growth for the crop to be handled with greatest profit. A good store of the necessary plant foods is, however, necessary, even with proper rotations and green manuring, as present freights prevent the profitable importation of lime or phosphates for dressing the soil. A soil that is easily workable and still contains the essential fertility will prove more profitable than one of a hard unwieldy texture.

**TRANSPORT.**

Distance from the railway is one of the important factors in this country at present. It is reckoned that for every 15 miles beyond 10 from the railway

25% more wagons are required. This means that the maximum distance from the railway at which wheat can be profitably grown is soon reached.

It is impossible to lay down any hard rule as to the price a man should not exceed in purchasing land for wheat. To do so at the present stage is, however, hardly necessary. Present day market prices are well within the limit the efficient wheat farmer can afford to pay, and only in certain favoured areas are prices likely to exceed that limit within the next few years. Land on or close to the railway, is, as might be expected, more costly than that of similar quality further out, so that the intending settler with small capital may find it necessary to take up land some distance from the line, but hard work and efficient management will do much to counter the increased cost of transport.

In making his selection, the intending settler will do well to see that his land is well provided with permanent water easily accessible, and that he is favourably situated as regards timber for building and fencing purposes and fuel. This need not of necessity be on his own land. Neither need his farm be in the immediate vicinity of a native reserve, but he should be so situated that he can obtain supplies of labour adequate for his needs.

In the districts where wheat is at present grown the climate is generally healthy for Europeans.

Having, after careful consideration of the matters already dealt with, made up his mind to go in for wheat, and secured the right class of land for that purpose, the newcomer has then before him a task which, however romantic it may appear on paper, requires a strong back as well as a strong mind.

He will be well advised to combine the keeping of pigs, poultry and a small dairy herd with his wheat farming, as the presence of these on a farm helps to reduce the cost of living, provides a profitable outlet for what otherwise would be waste, and, if he has ready access to the local markets, secures a small return from the sale of any surplus. The number of head of livestock kept will depend on the size of the

farm and to some extent on the inclinations of the individual. It can be reckoned that 50 bullocks will do for 100 acres of wheat within five miles of the railway. Outside that radius the number required will increase, other things being equal, according to the distance.

#### MACHINERY AND TOOLS.

It is general in East Africa at present to use the Australian combined harvester and stripper. With a good store of spares on hand, and given anything like a good season, two of these machines will harvest 150 to 200 acres. One grader and one winnower if of good size will answer for the grain off 500 to 600 acres. Newcomers should co-operate with each other when possible in buying harvesting machinery. The wheat farmer would be well advised to keep himself fully supplied with tools, spares, treck tackle and the hundred and one odds and ends necessary to efficient management.

#### BUILDINGS.

A store 100 feet by 30 will hold 500 to 750 bags of wheat. The floor should be well made and be very smooth and free from cracks. Ventilation should be provided in the sides and roof. Corrugated iron is not the most suitable material for the sides and roof: its strong attraction for the heat keeps the temperature of the store at a point that favours the spread of weevils and causes the wheat to heat quicker if it should happen to be a little on the wet side and in need of turning.

The farm house will be built to suit the purse and taste of the owner. Pig stys should be of thatched roofs and post sides, dry and well drained. The cattle bomas should be well drained and of ample size to prevent their getting into a boggy condition during the rains. They should be built next the lands where the cattle are needed for work. A cheap and efficient method of providing shelter during wet cold nights and dry feed when required, is to erect in the middle of the boma a shed with walls of posts just as high above the ground as an ox can comfortably reach. On these dried grasses are stacked, to serve the double purpose of providing shelter and food.

#### COSTS.

It will be seen from the foregoing that the first costs of wheat farming on anything like a large scale



are fairly considerable: so much so that they would prove discouraging to many people if the other side of the business were not considered. Wheat being a crop that can be efficiently handled at almost every stage by machinery, the cost of labour in producing, harvesting and marketing it, is small. This is an important consideration, as should a crop fail the loss is comparatively small compared with other crops requiring large quantities of labour. Although yields as high as 26 bushels to the acre have been obtained during the past two years in certain parts of the Highlands, an average good crop may be taken as four 200 lb. (nett) bags per acre, which is worth about £4-10-0. The costs of production can be, and are, easily kept under £2, so that a good margin of profit is left to the grower.

The present local consumption is equal to the **MARKETS.** production of 60,000 acres, and as the wheat-consuming population is rapidly increasing, the wheat farmer need have no anxiety about markets for many years to come. Wheat farming works in so well with the farming of livestock that both can be made very profitable on the one farm, economy of labour being effected by the combination. As a rule, where wheat is grown horses do exceptionally well, so that the wheat farmer can without detriment to his main undertaking engage in a branch of stock breeding of great promise.

No attempt has been made to estimate the initial **CONCLUSION.** capital required for a successful wheat proposition. Given the broad outlines, the prospective settler should satisfy himself on the spot as to the rest. Those of us engaged in the industry in East Africa believe that wheat growing will stand the most careful investigation, and would welcome more planters of the right stamp. But we do not tell them that wheat is the best thing in the farming line, for there is no best type of farming, whatever individuals successful in a particular branch may say to the contrary.

The writer will be very pleased to answer any inquiries from intending planters on points raised or suggested in this essay.

A. L. HARRIS.

## COFFEE.

ITS HISTORI-  
CAL IMPORT-  
ANCE TO B.E.A.

WHATEVER may be the ultimate position of coffee in the agricultural life of East Africa, the future historian will be certain to accord it prominence if only for the influential part it played in attracting attention to the country as a field for European colonisation. At a time when, according to many, the future of the East African Highlands trembled in the balance, coffee turned the scale in favour of still further perseverance and still further effort.

THE TURN OF  
THE TIDE.

Attracted by its magnificent scenery, wonderful fauna, rich soil and alluring climate, enterprising pioneers drifted into the country in small parties in the opening years of the century and started experimenting with a wide range of crops. The ultimate results were in no case wholly successful—either the crops grew and rotted for want of a market, or partly failed through want of experience—so that after the expenditure of much energy and patience and more than was desirable of their limited stock of capital—they became faced by a situation sufficiently grave to cause a feeling of dissatisfaction among even the most optimistic. Several gave up in despair and left the country, worse off financially and physically than when they entered it; most of the others ceased their experiments and contented themselves with producing just sufficient to satisfy their everyday needs. Then, just at the darkest hour of the crisis, when confidence in the future of the country was rapidly giving way to despair, coffee came to the rescue. Small shipments from the experimental plantations of the earliest pioneers placed on the London market attracted the attention of buyers, were favourably reported on, realised comparatively high prices—and confidence was restored. Men saw in this first small success that their faith in the country was justified, that time and perseverance only were required to prove their belief in the possibilities of its wonderful soil and climate, and that some day they would reap a rich reward for their labour. That they were justified in their faith is fast being proved in various directions.

Notwithstanding, however, that coffee has realised the reasonable expectations of those who have studied and engaged in its production, a word of warning is necessary to those who think that it is only necessary to plant up a hundred or two acres of coffee in order to secure a rich competence for the rest of one's days in this world. Coffee is not a gold mine, figuratively speaking, as some people seem to think. It is a sound agricultural proposition, and nothing more than that. It gives a handsome return on the capital invested and energy expended, but when due allowance has been made for all the risks involved, it is probably no more attractive than several other branches of agriculture in East Africa.

AS AN ESTI-  
MATE OF  
COFFEE  
PROSPECTS.

The amount of capital required to engage in the industry is dependent upon the intentions of the intending planter, and the qualifications of the man. For the purposes of this essay it is assumed that he is competent, after a short stay in the country studying local conditions, to choose the right piece of land for his purpose, that he has the innate ability and the acquired experience to ensure wise administration of his capital, and, of perhaps greatest importance, that he has the physical and mental qualifications of a successful agriculturalist. If he is going in for coffee only, the selection of his land is of paramount importance; whether he be engaging in coffee planting only or in mixed farming with coffee included, ability to spend his capital wisely is an essential factor to success, as are also a capacity for hard work, organising ability, a mind capable of gauging the relative value of details, the power of controlling labour of poor intelligence, and an unflinching capacity for hard work.

CAPITAL  
REQUIRED.

Five thousand pounds is generally considered the minimum required by one whose intention is to concentrate on coffee only. With this sum from two to six hundred acres may be acquired in a proven coffee district, of which in the case of the minimum area practically all would be suitable for coffee, and in the case of the latter the greater proportion—leaving sufficient for working capital to carry one along—assisted by the revenue from catch crops—until the coffee had reached the producing stage. A start can be made on much less, provided

MAKING  
A START.

the intending planter is satisfied to get away from the Railway or take up land in one of the less expensive districts, and give primary attention during the first two or three years to growing annual crops, gradually planting up with coffee as increasing revenue from the farm permits. This is much the better course for all but the really well-to-do, as coffee planting is an expensive branch of farming, and unless one is provided with funds to meet all and every demand while the estate is still in the unproductive stage, it is best to aim at making the farm pay its way in the shortest possible time. A not uncommon mistake of the intending coffee planter is to concentrate on a small area of choice land for which he has to pay coffee land prices, overlooking the fact that he must have land for the grazing of his working oxen and for other purposes. A more economical plan is to acquire a larger area of which only a portion is suitable for coffee. Such land is generally obtainable at a proportionally less price than small selected areas.

**SELECTING  
THE RIGHT  
LAND.**

Altitude plays an important part in the selection of land for coffee in the East African Highlands. From 5,000 to 6,500 feet are considered the limits of suitable elevation. In well sheltered districts coffee may grow at a higher altitude than 6,500, but it yet remains to be seen whether it will prove successful. An annual rainfall of between 35 and 60 inches is required. A good depth of soil is essential; the land must be well drained and free from stiff clays, and not too steep. Cleared forest land is generally considered the best class of soil, it being rich in humus, but in recent years coffee has been planted in different districts on classes of soil that hitherto were considered unsuitable, and has made good growth. None of it has been sufficiently long in bearing to prove whether such a policy is sound. In selecting land for coffee, therefore, the intending planter would be well advised to choose the red or dark chocolate loamy soils that have proved themselves.

**WINDBREAKS.**

In places exposed to strong winds, windbreaks are essential, and even in the case of well sheltered areas it is generally advisable to protect the plantation by a few rows of trees on the side of the prevailing wind. *Grevillea robusta* has proved itself one of

the best trees for this purpose, while the *Eucalyptus saligna* is also recommended, as in addition to making a good windbreak it is a useful timber tree. Neither should be planted within 30 yards of the coffee.

Shading is not generally practised in East Africa, though it has been recommended on several grounds. It is claimed by those in favour of the practice that it ensures a more uniform crop, lengthens the life of the coffee plant, and is a safeguard against over bearing. However, that may be, it has been found in practice that shading can be done without. SHADING.

If the planting up of an undeveloped property has to be proceeded with immediately the land has been purchased, plants have to be bought, but for several reasons it is advisable to raise one's own. A piece of gently sloping ground where the mould is rich and crumbly, is the most suitable for a nursery: not too near a river or stream where the water is likely to overflow the banks during heavy rains. The beds should be about four feet wide and raised six inches, the distance between them being about two feet six inches. This pathway between the beds also acts as a drain. The seed, which should be large sound beans selected from mature healthy trees, is planted in drills one inch deep, two and a half inches apart: the drills being five inches apart. The beds should be kept free of weeds, and for the first three or four months be shaded by screens about four feet high. They should be kept moist, but not be allowed to become waterlogged. NURSERIES.

The laying out of a plantation so as to ensure economical working requires careful study, and the intending planter who has not had previous experience would be well advised to spend some time studying the work on a plantation where development is still in progress before undertaking the task on his own account. LAYING OUT A PLANTATION.

Over the greater part of the Highlands there are two planting seasons, approximately April-May and October-November, coinciding with the "long" and "short" rains. Planting should commence as soon as the soil has been thoroughly moistened by the rains, every advantage being taken of dull cloudy PLANTING.

days, to save the freshly planted saplings from the scorching rays of the mid-day sun. Great care should be taken in carrying the plants from the nursery to protect the roots from exposure to the sun. As the coffee plant is a tap-rooted shrub, it is of the utmost importance that this root be straight and carefully put into the ground. The plants should be set firmly and not too deeply—not deeper than about one and a half inches above the nursery mark on the stem. With some it is the practice to plant up with nine months old plants, keeping them shaded until they are firmly established, but the more general custom is to use hardier plants and do without the shading.

**IMPORTANCE  
OF FREQUENT  
TILLING.**

Frequent tilling or cultivation is essential to the healthy life of a plantation, more especially in those districts where the rainfall is scanty; and, as a matter of fact, in those parts where the rainfall is heavy frequent cultivation cannot be avoided, as if left to themselves the coffee plants would soon be buried under weeds. Weeds harbour injurious insects and are the source of infection of fungoid diseases. In a neglected plantation diseases of one sort or another soon make themselves evident, and the planter has only himself to blame if he suffers through neglect to keep the plantation clean.

**PRUNING.**

Though East African coffee planters differ in their views on many points connected with the cultivation of the plant—further experience being necessary to prove or disprove the value of theories still subject to experiment—there is unanimity of opinion as to the necessity for and value of skilful pruning. No finality as to the best methods of pruning has yet been reached, however, and the inexperienced planter would be well advised to give this branch of his work close study. In an excellent pamphlet on coffee cultivation and diseases recently published by the Department of Agriculture, the subject is exhaustively dealt with, and a copy of the pamphlet should be in the hands of every intending planter.

**YIELDS.**

Except at the highest altitudes where coffee is successfully grown, a “fly picking” or “maiden crop” is obtained in the third year. This seldom amounts to more than three or four hundred weight

per acre, but in the following year a much heavier crop is reaped, and in the fifth or sixth year the maximum yield is attained. As much as one ton of cleaned coffee per acre has been obtained in different districts, and it is usual to speak of the average yield as half a ton per acre, but the writer prefers to accept the conservative estimate of 800 lbs. of clean coffee as quoted in the pamphlet above referred to. Careful selection of the plantation site, efficient management, thorough cultivation and unceasing vigilance against disease have all important bearing on yields, and the planter who pays due regard to these matters may reasonably expect better results than the one who does not.

In recent years a number of diseases have made their appearance on coffee plantations in the Highlands, and at one time it was feared that the industry might suffer the same fate as brought disaster to Ceylon. Such has not been the case, however. Precautionary measures taken by the Agricultural Department and the planters have been successful in preventing the spread or combating the effects of these diseases, and it may now be safely asserted that they are no longer regarded as a serious menace to the industry. *Hemelia vastatrix* or "coffee leaf disease," Thrips and Cut Worm have been the most destructive. The first two may be guarded against by spraying: the third by protecting the young trees against their attacks. It is not unlikely that as the area under coffee increases other diseases at present of little account will have to be reckoned with, while still others will appear. This has been the experience of most other young countries in their efforts to acclimatise exotic plants of economic value. Disease must of necessity appear before science can find remedies for them. Scientific study has already shewn that climatic and other conditions in East Africa are not less favourable to the combative measures employed against the present known diseases than they are to the diseases themselves, and it is therefore only reasonable to assume that the greater attention now being given to the problem will at least result in means being found to keep disease in check.

As soon as the berries begin to ripen, picking begins. For this light labour women, assisted by their children, are largely employed, and constant

DISEASES

HARVESTING  
AND MARKET-  
ING.

supervision is necessary to prevent unripe fruit being picked. The beans are then fermented for from 18 to 36 hours, washed and dried. Great care is necessary in all these operations, as on the manner in which they are carried out the market value of the coffee largely depends. If machinery for shelling the parchment off the beans and grading has not been installed, the coffee may be sent to a curing works or shipped as it is "in parchment." Shipping is effected in double bags weighing about 200 lbs. Arrangements may be made with one of several local firms engaged in the work to take charge of the coffee from the time it is put on rail until it has been sold in London or elsewhere. Advances of up to 75% of the value of the coffee can usually be obtained against shipping documents, a final settlement being effected on receipt of the account sales from the brokers.

#### **COSTS.**

It is not yet possible to give authoritative figures of the costs of coffee planting. No other branch of farming is subject to such widely divergent estimates. This is in great part due to the fact that two very different policies of planting are pursued; and partly to the influence of local conditions. The intending planter should bear this in mind when during the first few weeks after his arrival in the country he is apt to get bewildered by the apparently contradictory information showered on him. It is freely stated on the one hand that a plantation of one hundred acres costs £5,000 to bring to the bearing stage, and, again, that coffee need not cost more than £10 per acre if one goes the right way about it. Much depends on how one goes about it!

#### **PRICE OF LAND.**

As a branch of mixed farming coffee planting is not a costly undertaking: as an independent concern it is. Land especially suited to coffee is more costly than mixed agricultural land—whereas a choice selection of coffee land in such a district as Kyambu would cost from £10 to £15 per acre, a general purposes farm of 300 to 500 acres with from one tenth to one-fourth of the area suitable for coffee, in say the Nakuru district, might be had at £2 to £3 per acre. Thus at the outset the man whose sole object is coffee pays five times as much





*Photo by W. D. Young.*

**AN ENCOURAGING PROSPECT.**



*Photo French Mission.*

**COFFEE TREE IN BEARING.**

for his land as is paid by the mixed farmer. He has then to incur a heavy annual outlay for four years without any return. The mixed farmer in the meantime has been obtaining revenue from his maize, barley, beans or stock as the case may be.

The estimate of £5,000 being necessary for a plantation of 100 acres is little if any in excess of what is required if the intention is to concentrate on coffee to the exclusion of everything else. For the large capitalist or group the exclusive policy is probably the soundest eventually, having all the advantages of concentration of effort, but it means waiting for dividends, and efficient organisation and management are essential if the capital and energy expended are to be rewarded with the fullest measure of success. The proportion of waste is, as a rule, greater in the large undertaking, and in the case of coffee planting in East Africa the cost of labour and management is much greater proportionately in the large undertaking than in the small.

THE EXCLUSIVE COFFEE POLICY.

The policy of the mixed farmer is to make the farm pay the cost of his coffee undertaking as he goes along. He puts 50 to 100 acres of his best land under maize the first year. The following season he plants up a proportion of that area with coffee (the land being improved in condition by the previous crop of maize) and inter-plants it with beans or some other catch crop, at the same time increasing the area under maize. And so he steadily goes on—each year ploughing up fresh land for maize and adding to his area under coffee, re-paying himself out of the inter-planted beans for the cost of planting the coffee.

THE MIXED FARMING POLICY.

For coffee planting exclusively, the intending planter, if experienced, should be provided with not less than £2,500—if inexperienced, with as much more as he reckons his inexperience will cost him. With this sum he can secure from one to three hundred acres of land according to quality, erect all necessary buildings, pay the cost of planting up 50 to 80 acres of coffee, and carry through to the fourth year, when his first year's planting will have reached the bearing stage. If he has expended his money wisely, the value of his property should be sufficient to justify the bank in advancing him what-

CAPITAL REQUIRED FOR COFFEE ONLY.

ever is needed for the purchase of machinery and working capital for the fourth year.

**CAPITAL RE-  
QUIRED FOR  
MIXED FARM-  
ING.**

In the case of mixed farming with coffee included, a start may be made on as little as £500 if the man is a practical farmer with colonial experience, equal to plenty of hard work and of the type that recognises and seizes opportunities. Five hundred pounds is not, however, sufficient for the inexperienced. Working on the minimum sum it would be necessary to exercise the utmost care in selecting the land (which would be brought on extended terms of payment), to lose no time in getting the largest area possible under maize or some such quick return crop, to be satisfied for a year or two with primitive buildings, simple living and hard work. B.E.A. has plenty of room for thousands of such men, and can offer them as rich rewards as any other part of the world. The first year no attempt would be made to plant coffee (though the nurseries would be got ready), but the following year 20 acres might be planted and again 20 the next. In the fifth year the first 20 would be bearing and successive lots of 20 coming on.

**RETURNS.**

Since it was first introduced to the home markets, East African coffee has steadily won its way into public favour, and of late years has invariably commanded the highest market prices. Prior to August, 1914, it was selling in Mincing Lane at from £60 to £90 per ton. Since the outbreak of war prices have fluctuated considerably, falling as low as £50 and going as high as £130. In every case, however, the prices realized were equal to the best market prices of the day. Assuming an average price of £75 per ton (first grades selling better and the lower grades at less); a yield of one-third of a ton per acre (which is a conservative estimate), the cost of preparing and shipping at £21, (an advance of 20% on pre-war rates), the gross return per acre should be £18. If from £3 to £5 per acre be allowed for cost of maintenance and picking the crop, a nett return of £15 to £13 is obtained. These figures, to the writer's knowledge, are well below the average returns of existing plantations.

That they will be maintained for some years to come is more than likely.

Had it not been for disease making its appearance among the plantations at an early stage in their development, and subsequently the outbreak of war, the prospects of coffee planting in the Highlands would probably have been held forth as East Africa's paramount attraction for the intending colonist, to the exclusion of everything else. At one time there was every likelihood of this happening, but the appearance of disease chastened the unduly optimistic, and the period of depression following the outbreak of war gave time for reflection.

THE FUTURE.

We have now been able to balance up accounts and arrive at an accurate estimate of the situation. For the tropical agriculturalist, especially those who have already had experience of that branch of planting, coffee should prove the greatest attraction the country has to offer. But for the inexperienced it should be weighed in the balance—after arrival in the country—with the several other branches of agriculture that have proved at least equally successful. With the possible exception of flax—the price of which is at present abnormally inflated—no other crop may shew the same return per acre, but when all the circumstances have been taken into consideration it will be seen that coffee planting gives no greater return than might reasonably be expected of it. That it does give a reasonable return on the capital invested is above question, and that it is likely to continue so doing is a safe assumption. East African coffee has now firmly established its position on the world's markets. As, being of a different class, it does not compete with the coarser sorts exported from Brazil and neighbouring countries, it would not be much affected as regards prices by increased exports from these countries. There is no fear of over-production for many years to come. Consequently prices should remain firm, and as the costs of production are not likely to increase to any serious extent, the nett returns should not be much less than they are to-day.

I am indebted to Claud R. Watson Esq., of Khadini, Nairobi, and J. Gerald Ferguson Esq., General Manager of the Uganda and East Africa Coffee Curing Co., Ltd., for invaluable assistance in the compilation of this article.

ACKNOWLEDGMENTS.

THE EDITOR.

## CITRUS.

### ORIGIN OF THE LOCAL INDUSTRY.

If, as many predict, the citrus industry assumes large proportions in East Africa, it will be interesting to recall that it developed from very small beginnings. Impressed by what appeared to be favourable soil and climatic conditions, some of the earliest settlers in the Highlands imported small quantities of orange, lime and lemon plants from South Africa and elsewhere in the hope of adding variety to the fruit obtainable in the country, and it is out of this humble origin that the citrus industry has sprung. The trees grew so rapidly and fruited so heavily that, inevitably, the possibilities of growing citrus on a commercial scale began to be considered, and had it not been for the outbreak of war the acreage under citrus would have been increased many fold during the past three years.

### FAVOURABLE NATURAL CONDITIONS.

It is only during the present year that the first citrus plant in East Africa started operations, so it will be seen that the industry is still in its infancy. The figures quoted in this article are based on the work of the factory in question, and should not be taken as final. Further experience and experiment are necessary to show whether they cannot be improved on. One can, however, speak definitely on certain points. For instance, there can be no question as to the soil and climate of portions of the East African Highlands being suited to citrus. The trees make at least as good growth here as they do in the West Indies. Yields are as heavy, and the percentage of oils and acids is as high. Diseases and pests are few, and can be coped with. These are the essential factors to success. Having these, capital and efficient management only are necessary to make the industry commercially sound.

### PREFERENCE FOR THE LEMON.

Unlike the West Indies, where the lime is chiefly grown, East African conditions and methods seem to decide in favour of the lemon, and although lime plantations have been laid down it is not unlikely that greater attention will be paid to the lemon in future. The lime being a surface feeder, it is very difficult to keep a plantation clean, as if cultivators are used the minute surface roots which play such an important part in feeding the plant are broken, with resultant injury to the plants; while the expense

of hand labour on a large plantation would seriously affect the cost of production.

An important consideration in connection with the selection of a citrus plantation site is that it need not of necessity be close to the railway, the cost of transporting the finished product being relatively small. A dry sandy soil is to be preferred, in a district where the average annual rainfall is about 45 inches. Citrus does not require the deep loamy soil so much in demand for coffee, but anything in the nature of swampy land is altogether unsuitable.

SELECTION  
OF THE PLAN-  
TATION SITE.

Timber for fuel purposes is a very desirable asset, as the plant for a small plantation will consume a ton per day. If there is no timber or insufficient on the land itself, close proximity to a Forest Reserve will generally solve the difficulty, but the prospective planter should satisfy himself before hand that he will be given a permit to obtain timber in the Reserve.

The land should be twice ploughed and harrowed and reduced to a fine tilth: it will be all the better for an initial crop of maize or beans. The holes 3ft. x 3ft. x 4ft. deep, should be dug at least three months before the planting is to be done. The writer has found 20ft. x 25ft. the most satisfactory planting distances, the 25ft. lines being in the direction of the prevailing wind. During the first year it may be necessary to water the plants once a fortnight in the dry season, but once they have got thoroughly established this is unnecessary. A catch crop of beans or maize may be grown while the plants are still young without causing any loss of nutriment to the plants, and as this practice helps to pay the cost of establishing the plantation it is becoming general.

METHODS OF  
PLANTING.

Whereas in the West Indies it seems to be the practice to allow weeds and grasses to grow rather freely in the lime plantations, in East Africa clean cultivation is the general rule, as it has been found that thorough cultivation results in healthier trees and heavier yields. Single ox cultivators are freely used for this purpose, as are also disc harrows.

CULTIVATION.

The less pruning citrus trees receive the better. The young plants are trimmed to give a well shapen

PRUNING.

tree springing from one main stem, and are topped when they attain a height of not more than 12 feet. A single spraying with arsenate of lead between the rains is generally sufficient to ward off disease, but if disease does make its appearance continuous spraying is necessary until it has been eradicated.

#### RED SCALE AND ITS REMEDY.

The only disease that has given trouble up to the present is Red Scale, which has found its way into several plantations. This is effectively dealt with by fumigation. A canvas cover is spread over the tree and a pot or jar not less than 8 inches deep containing a preparation of sulphuric acid, cyanide of potassium and water is left under it for not less than forty minutes. The fumes arising from this preparation kill the disease but do no harm to the tree. It is of the utmost importance that the cyanide of potassium be absolutely pure, as otherwise it lacks strength and renders the preparation ineffective.

#### YIELDS.

In the third year the trees bear a light crop. In the fourth a healthy tree should return 1,000 lemons, increasing until the trees reach maturity in about the 6th year. If the trees are bearing too heavily it is better to sacrifice some of the fruit for the sake of the tree, but in the ordinary course of events the fruit is picked only when fully ripe, otherwise a loss of oils results. The sooner the fruit is treated after picking the better, a fortnight being the extreme limit that should be allowed to elapse between picking and treating. The principal fruiting season in most districts is from May to August, but picking proceeds practically all the year round.

Apart from the local demand for fresh limes and lemons, which is mainly supplied by small growers, no attempt is made to export limes or lemons as fruit. An export trade in fresh fruit or pickled limes may possibly develop later on, but at present the aim of citrus growers is to build up a trade in extracts.

#### TREATMENT OF THE CROP.

The first operation in this process is the extraction of the essential oil from the rind. This operation is performed by putting the fruit through either a hand or power-driven machine known as an Ecueller, which extracts the oil from the rind, ready to be bottled. The essential oil thus prepared is allowed to stand for from three to four weeks, when



it is filtered to separate the deposit known as limettin, and the oil packed in casks or copper vessels is ready for shipment.

After the extraction of the essential oil, the lemons are put through a mill consisting of a scratcher that cuts them up and a pair of rollers extracts all the juices; then through a strainer that separates all foreign matter and leaves the juice absolutely pure. The juice is then run into vats of from six to eight hundred gallons capacity, and brought to a boil by steam passing through copper coils. When the product required is citric acid (or concentrated lime-juice) the juice is boiled down to one-tenth its original bulk. In the production of citrate of lime it is brought nearly to a boil, mixed with lime (of which there are large deposits in the country) at the rate of half a pound of lime to a gallon of juice, and left to settle, the citrate forming a firm deposit at the bottom of the vat. The liquid at the top is then run off. Subsequent washing and drying of the deposit completes the process of preparing citrate of lime. Citric acid is shipped in barrels and citrate of lime in boxes.

Supplies of local lime are readily obtainable, but great care must be exercised to see that it does not contain more than 2% of magnesia, as the presence of magnesia in the lime in excess of 2% lessens the value of the citrate.

Fifty acres may be considered as the minimum area justifying the cost of the extracting plant required. But the intending planter, even if his immediate aim is only a fifty acre plantation, would be well advised to buy a larger area if his capital permits, as even if he does not require it for enlarging his plantation later on (as probably he will) the extra land will provide him with grazing for his trek oxen and enable him to settle native families on his land to provide labour as required. The price of land suitable for citrus varies considerably according to locality and natural features, ranging from £2 to £10 per acre. Above the cost of the land, £500 working capital would be required and a further £500 for machinery. These are the amounts required, but it is not essential that a man should have £1,500 to £2,000 to engage in citrus growing. He may start with very much less if he has had previous experience

of farming, and can replace capital by energy and enterprise. Such a man could acquire his land on extended terms of payment, grow maize, beans or barley while waiting for his citrus to reach the productive stage, cheapen his cost of living by raising as much as possible of his requirements and by occasional spells working for others. By the time he was in need of an extracting plant his land would be of more than sufficient value to serve as security for a loan to purchase it.

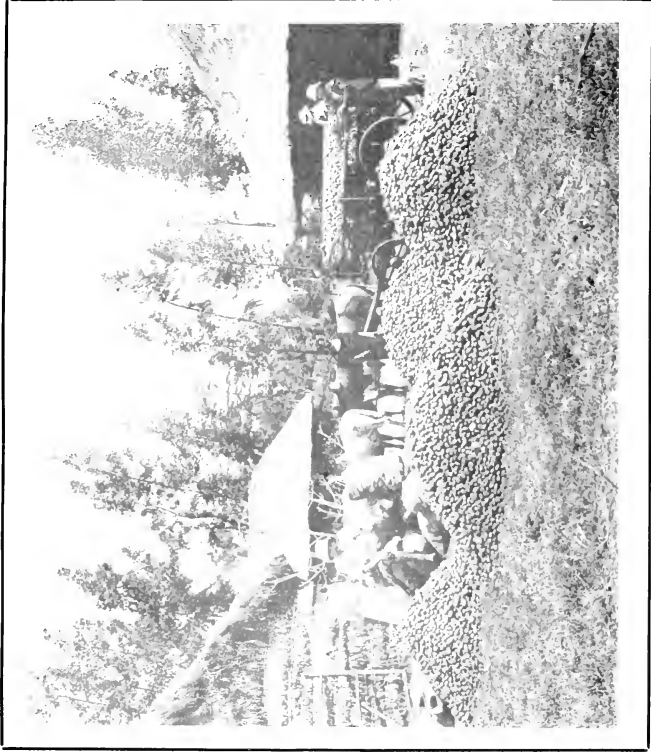
#### RETURNS.

Though well established trees produce considerably more, 1,000 lemons per tree is taken as the standard of production for the purposes of this essay. Planting 20ft. x 25ft. gives 80 trees to the acre, or 80,000 lemons, equivalent to 266 barrels each containing 300. 266 barrels will produce 50 lbs. of ecuelled oil of lemons, and 938 lbs. of citric acid or citrate of lime. Much depends upon the care and skill displayed in the several processes of manufacture, and it is not unlikely that the figures given will be improved on when the workers are more experienced. With ecuelled oil of lemons selling at 10/- per lb. citric acid at £5 per cwt., and citrate of lime at the same price, £42 per acre is obtained.

#### PROSPECTS OF THE INDUSTRY DEVELOPING.

When the comparatively small amount of capital involved, the limited labour supply required (ten to twelve natives being sufficient for 50 acres), and the scarcity of disease or other risks, are taken into consideration, these figures present a return that will compare favourably with most other branches of agriculture. In the East African Highlands there are no hurricanes to bring destruction to plantations as in the West Indies: a plantation once established will endure for many years if only reasonably well looked after. Citrus cultivation involves neither the labour nor anxiety of seasonal crop farming, and should for that reason appeal to the man who, though desirous of engaging in agriculture, is not physically fitted to take up its more laborious branches. Though it may be yet too soon to say that East Africa is destined to become a rival of the West Indies in the output of citrus products, it is safe to say that the natural conditions are all in her favour, and that the progress already made has exceeded the expectations of those engaged in the industry and justifies their high hopes for the future.

J. P. LUCY.



*Photo by W. D. Young.*

**ON A KYAMBU FARM.**



3 1/2 YEARS OLD CITRUS TREES, RONGAI VALLEY.

## MISCELLANEOUS CROPS.

### POTATOES.

ONE of the earliest efforts to establish an export trade in produce from the Highlands was made with potatoes, but owing to packing, transport and shipping difficulties the trade was not developed as under other circumstances it would have been. The complete loss of one or more consignments in transit helped to discourage exporters, and since the outbreak of war the quantity of potatoes exported has been small. With proper organisation and improved shipping facilities, however, considerable development in this direction might be expected. Heavy crops of excellent quality can be raised without manuring of any sort. Yields of nine tons per acre are common on virgin forest land, but continuous cropping rapidly reduces the output. Four tons to the acre can be counted on without manuring, however, and as the cost of production is low this yield should give a handsome profit to the grower on a fair market. In the development of an export trade a considerable output could be reckoned on from native growers, but government supervision would be necessary to ensure the planting of good seed only.

EARLY  
ATTEMPTS  
TO EXPORT.

### COCONUTS.

It is the confident anticipation of many that after the war the coconut possibilities of the Coast Belt will receive wide spread attention. The coconut palm is indigenous to East Africa, but has been cultivated by the native and Arab only as a source of liquor supply. Since plantations have been laid down by European planters, however, efforts have been made to discourage the tapping of trees—which is disastrous to the tree as a source of copra supply—and to demonstrate to the native the benefits of proper cultivation. From Vanga to Lamu—a distance of approximately 200 miles—for a depth of 25 miles inland, the deep sandy loams with coral-rag sub-soil so eminently suited to coconuts, are found in large patches, and as this belt is outside the cyclone and hurricane zone, besides enjoying a regular ample rainfall, the cultivation of coconuts should prove a highly remunerative investment. Diseases and pests are few, and with the exception of the Coconut Beetle, of little account. Owing to the neglectful methods of native growers, the Beetle has been

GENERAL  
CONDITIONS.

allowed to spread to European owned plantations, and has caused much damage to young palms. The efforts being made to cope with this pest are proving highly successful, and as the beetle is easily trapped and destroyed, its eventual eradication should be possible.

#### CAPITAL AND REVENUE.

For the cultivation of coconuts a considerable amount of capital is required—certainly not less than £20 per acre. Individuals working on their own account might reduce this figure by as much as 25%, no allowance being made for their labour and supervision. The growing of such catch crops as caravonica cotton, beans, maize, sim-sim and chillies, is largely resorted to as a means of reducing the cost of development, and where the conditions are suitable this is a sound policy.

#### YIELDS.

No return may be expected from coconuts until the sixth year, when, on a well cultivated plantation a yield of 10 nuts per palm may be obtained. This yield rapidly increases, until in the tenth and succeeding years 50 nuts per palm would be the output. The usual planting distance being 25ft. x 25ft. or 75 palms to the acre, this would give 3,750 nuts to the acre.

#### RETURNS.

This is equivalent to rather more than 12 cwt. of dried copra, 4 cwt. of shell and 4 cwt. of fibre per acre per annum, which, calculated on the market prices ruling at any time during the past ten years represents a very handsome return on the capital outlay. There is already a market at Mombasa for coconut products, the present-day prices being about £25 per ton for copra, £3 per ton for shell, and £30 per ton for fibre spun into yarn. The output has been steadily increasing for several years past, and in the course of the next few years the export of coconut products from the Coast Belt should assume large proportions.

#### BEANS.

#### THE SMALL FARMER'S CROPS.

The exceptionally high prices that have been ruling for beans in the European markets since the outbreak of war have encouraged settlers in the East African Highlands to devote more attention to this crop, and had freights been available the Protectorate might have undertaken to ship very considerable quantities to Britain. Only a small proportion of

the output was shipped—the bulk of the crops being required by the local military authorities for the native troops and carriers. With the possible exception of maize, beans is the most profitable crop for the new settler to make a start with. They are easy to raise, are less affected by drought than most other crops, yield heavily, give a quick return and are easily marketable. Were it not that they necessitate so much hand labour at harvesting, they would be more generally grown, but except in those districts where labour is both plentiful and cheap they are planted only as a catch crop. The Canadian Wonder, Rose Coco and Noyon au Blanc varieties have up to the present proved most popular, but of late the Madagascar bean has sprung into prominence, and the Soya bean is receiving increased attention since it has been found that satisfactory yields are obtainable from acclimatised seed. Yields vary considerably among the different varieties, Canadian Wonder being one of the heaviest croppers, half a ton per acre being about the average return.

#### BARLEY.

Barley of excellent malting quality is raised in several districts, and samples sent to South Africa were favourably reported on and encouraging offers made for quantities. Yields of up to ten bags to the acre have been obtained. Very little trouble is experienced from rust.

TEN BAGS  
PER ACRE.

#### OATS.

So far very little success has attended the efforts being made to obtain suitable strains of seed, but experiments with this end in view are being continued, and it is hoped that by the aid of selection, acclimatisation and hybridisation suitable strains will be isolated. On new land comparatively good yields are obtained, but rust soon makes its presence felt, and as there are so many other crops offering the settler better financial returns, oats are not persevered with.

NOT YET  
PROVEN.

#### SIM-SIM.

Sim-sim or Sesamum is largely grown by the natives in the Nyanza Province—the seed being largely used by them for food—and during the past

A COAST  
CATCH CROP.

few years an export trade in the seed has been developing rapidly. Its cultivation by Europeans is confined to the Coast Belt, where it is being grown as a catch-crop on the coconut plantations.

#### CHILLIES.

ALREADY  
AMONG  
EXPORTS.

Chillies have figured prominently in the exports from Kilindini for some years past, Uganda being responsible for the greater portion. Their cultivation is practically confined to the natives and Indians, who are given every encouragement by the Government to increase the area devoted to them and to exercise care in the selection of seed.

#### RICE.

So far very little has been done to utilise the comparatively large areas situate at the lower altitudes suitable for rice. A number of small swamps have been reclaimed in the Mumias and Kisumu districts and put under rice, with very successful results, and it is only a matter of time when much greater attention will be devoted to this highly important food crop.

#### BROOM CORN.

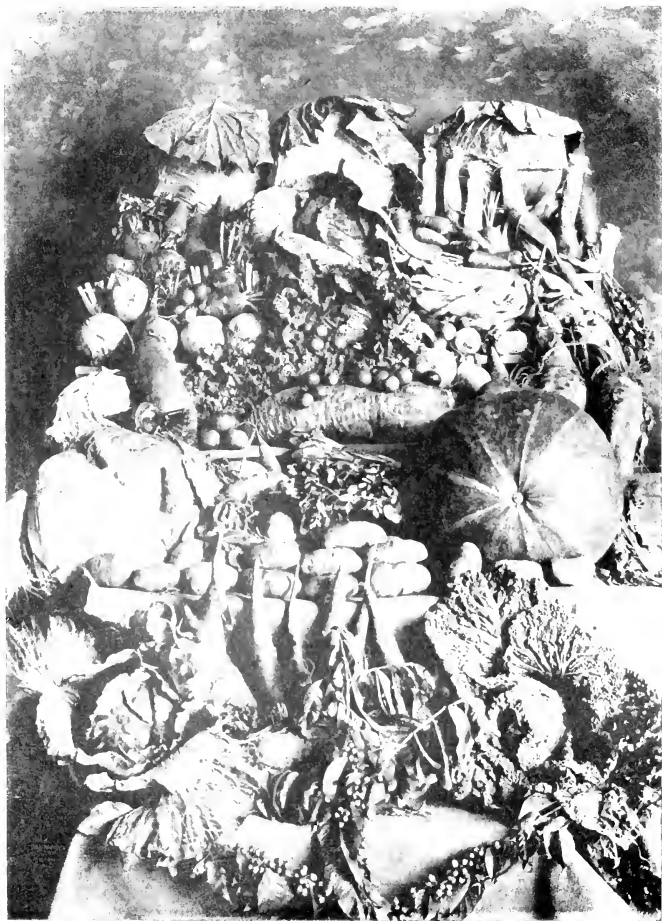
FOR THE  
MIXED  
FARMER.

Encouraged by the success of experiments conducted at the Kabete Experimental Farm for a number of years, settlers in the Nakuru district have this year taken up the cultivation of broom corn on a commercial scale, and have produced switches equal to the best Italian. The results of their efforts are being watched with close interest, and if they are commercially successful broom corn will be yet another addition to the wide variety of crops from which the mixed farmer may select.

#### ARROWROOT.

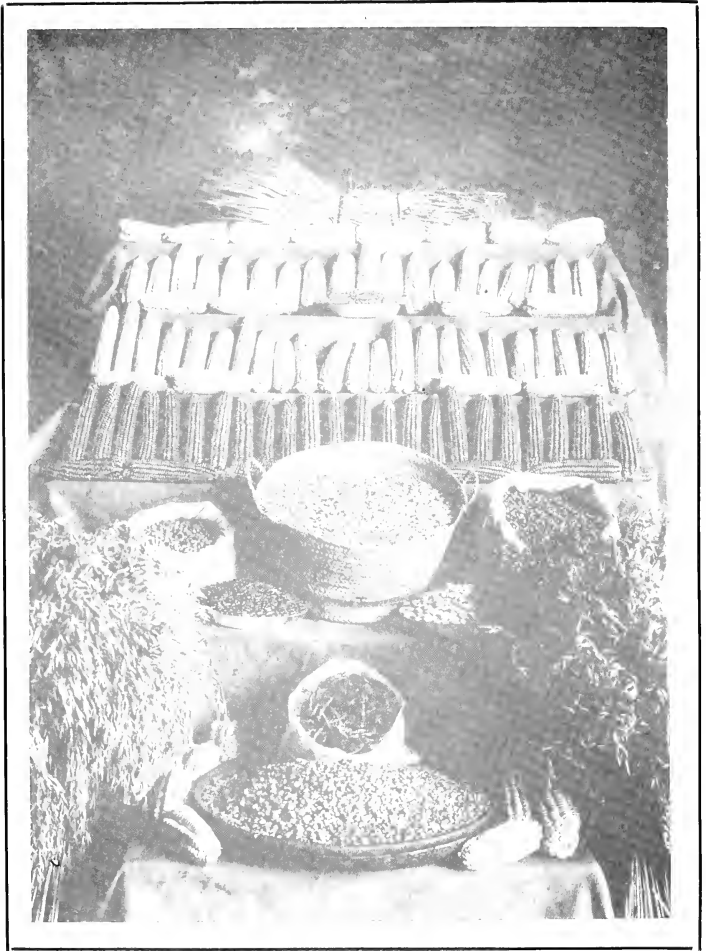
Successful experiments conducted at the Mazeras Experimental Farm are responsible for arousing interest in the possibilities of arrowroot. Just prior to the outbreak of war some thousands of plants were distributed among settlers desirous of engaging in its cultivation with a view to establishing the industry on a somewhat large scale in the Protectorate, but the situation created by the war has delayed the fruition of their project.





*Photo by W. D. Young*

**PRODUCE OF B. E. A.**



*Photo by W. D. Young.*

**PRODUCE OF B.E. A.**

## LUCERNE.

Only in exceptional cases has it been necessary for a VALUABLE FODDER CROP. the stock breeder to supplement the rich indigenous pastures of the country with cultivated grasses, but lucerne is largely grown for pigs, working oxen, and dairy stock. In such districts as Limuru 6 tons to the acre are obtained without irrigation, and on the shores of Lake Naivasha, where seepage takes the place of irrigation as much as 12 tons per acre is cut per annum.

## KAPOK OR SILK COTTON.

The developing commercial importance of kapok or silk cotton has drawn attention to the experiments being conducted with this plant at the Kibos Experimental Farm, and its cultivation on a large scale in the near future is more than likely.

## COTTON.

The cotton possibilities of large stretches of land on the Tana and Juba rivers have already been abundantly proved, but a heavy outlay on irrigation works is necessary before their development can be undertaken. Cotton is also being grown in the Nyanza Province with good results, and as no irrigation is necessary in this district the area under cultivation is being steadily extended. AWAITING EXPLOITATION.

## MISCELLANEOUS FRUITS.

Though East Africa is not rich in indigenous fruits, the soil and climate have shewn themselves favourable to a wide variety of imported varieties, and it is only a matter of a few years when fresh and preserved fruits will figure among her exports. The banana is largely grown by the natives, especially in Uganda, for food, but plantations on the lines followed in the West Indies are unknown, and no attempt has yet been made to test the possibilities of a trade in banana fibre. Among the imported fruits that have proved highly successful and are being largely grown, may be mentioned the pineapple, custard apple, avocado pear, pawpaw, strawberry, loganberry, loquat, fig, apple, peach, plum, and quince. Pears of exceptional quality have been raised in a few districts, as have also grapes. AN IMPOSING LIST.

## TOBACCO.

STILL THE  
SUBJECT OF  
EXPERIMENT.

Large quantities of tobacco are grown by the native population in various districts. This tobacco is coarse in quality and not suitable for consumption by Europeans.

At the coast, natives in the Tanaland Province grow a superior class of leaf which in appearance resembles "Bright" American tobacco; the writer inspected some most attractive leaf of this description on the Island of Patte in the year 1915.

The cultivation of tobacco suitable for local European consumption or export has not so far been attempted by settlers on an extensive scale.

The trials which have been carried out by the Department of Agriculture during recent years have shown that tobacco of this class can be grown in certain areas of the Protectorate, e.g., Kibwezi and Machakos, where light sandy loams are found suitable for cigarette tobacco culture.

A PROMISING  
SAMPLE.

A sample of sun-cured leaf grown from imported American seed at Kibwezi was sent together with other samples from Kabete to the Imperial Institute for report in 1914. It was submitted to a commercial firm who stated their opinion as follows: "This is the best sample sent. It is of very good colour and appearance, and of smooth texture."

A small trial of several varieties of tobacco was made at Malindi in 1915 with promising results, and it is thought that Turkish cigarette tobacco might be grown in the coast belt. This variety has not proved a success in the highlands owing to its high susceptibility to fungous diseases.

In the Rongai and Uasin Gishu districts, settlers produce a limited quantity of tobacco for local consumption.

The trials at the Government Farm, Kabete, which have extended over several seasons and included experiments with most of the principal varieties of leaf and known methods of curing, prove that tobacco of a strong coarse character can be grown, but the Kikuyu red soil does not produce a light or mild tobacco.

## KYAMBU.

**T**HE administrative district of Kyambu comprises **SITUATION.** rather more territory than this article is intended to deal with, including, as it does, Escarpment, Limuru, Dagoretti, Kikuyu and northwards to the Chania River as well as Kyambu proper. The altitude, therefore, ranges from approximately 5,000 feet to over 7,000. This, with an average rainfall in different parts of the district from 38 to 56 inches, and wonderfully rich soil, gives the possibility of such a range of products as is probably unsurpassed in any other part of the Protectorate.

The main portion of Kyambu consists of a series **TOPOGRAPHY.** of ridges running east to west, on the eastern end falling away into the Athi Plains and on the western terminating in the Kikuyu Escarpment overlooking that remarkable natural chasm—the Rift Valley. Here are Mount Suswa and Mount Longonot, both extinct volcanoes. It may be assumed, therefore, that the formation of the Kyambu district is due to the volcanic action of these two mountains in the dim and distant past.

The country rock of the district is purely **SOIL** volcanic, much of it being solidified ash, with, in **FORMATION.** places, an admixture of iron. In parts evidences of sedimentary rock are to be seen, and good workable lime has been found. The soil of the district is mainly composed of red loam of immense depth. A peculiarity of the soil site is that the greatest depth is on the ridge tops, while on the valley slopes the country rock is exposed to a larger or smaller extent. This would seem to indicate that until quite recently the whole district was covered by forests and that the soil is the product of centuries of tree deposit. That this is the case is evidenced by the fairly general existence of roots of the muhogo and wild olive trees, the wood of which are impervious to the ravages of termites (white ants) and of rot. Such is the soil which has already shewn itself capable of wonderful production, and which, under careful husbandry provides almost inexhaustible supplies of plant foods.

The district is exceptionally well watered—no **WATERWAYS.** fewer than eighteen rivers and streams flowing

through the higher reaches between Nairobi and Chania—a distance of approximately twenty-five miles—with innumerable falls providing power for water-driven machinery. In addition to these streams—none of which have ever been known to go dry—there are springs of clear fresh water on nearly all farms, providing an excellent water supply for household purposes.

GENERAL  
AGRICUL-  
TURE.

One of the first districts in the Highlands of East Africa to be settled by European colonists, Kyambu has for over ten years been producing a very varied assortment of crops. These have comprised vegetables of practically every known species; cereals of all kinds—maize, oats, wheat, barley—and legumes, as well as tropical, sub-tropical and temperate zone fruits. Of late, however, the success which has attended coffee cultivation has served to squeeze out some of the other industries, particularly crops which require seasonal ploughing and sowing. The word “seasonal” is used intentionally, as two rainy seasons in the year call for six-monthly ploughing and cropping.

PRINCIPAL  
AGRICUL-  
TURAL  
INDUSTRIES.

The principal agricultural industries of the administrative district of Kyambu are coffee and wattle, as will be seen from the following returns compiled in July, 1916:—

Area under Coffee	...	11,616	Acres.
„ „ Wattle	...	7,798	„
„ „ Sisal	...	2,320	„
„ „ Citrus	...	416	„

The soil and climatic conditions are so favourable to coffee that the present steady annual increase in the area under that crop would be very much greater were it not for fear of insufficient labour to handle it when the production stage has been reached. This is the only factor militating against the more rapid development of the coffee industry in the district. The problem of establishing an organised system of labour supply is already receiving attention, and a solution equitable to all the interests concerned is looked for in the near future.

COFFEE  
DISEASES.

Kyambu coffee stands without a superior if the price it brings on the world's markets be taken as a criterion of value, and it invariably commands

the highest price of the day. While the quantity cropped per acre is fairly high, in a good season the returns fluctuate to such an extent according to local circumstances that, in the absence of properly compiled statistics, it might be misleading to quote any figures. In many cases of low yields the cause is traceable to the ravages of the *antestia bug* and *thrips*. The fungus *Hemeleia vestatrix* has also been responsible to some extent for yields below the average, but so far as this disease is concerned experiments conducted over a number of years have led to the opinion among experienced planters that the prevailing dry climate is against the rapid spread of the fungus, which is kept under control at a low cost by spraying. Insect pests on coffee will be the special research work of an entymologist as soon as one can be procured by the Agricultural Department.

Wattle is grown mostly at the higher altitudes of Limuru; sisal receiving attention around Ruiru, (the altitude of which is about 5,000 feet), and in the adjoining Thika and Fort Hall districts. The citrus industry is still in its infancy, and though the fruit returns from earlier plantings are most favourable, it cannot yet be said that Kyambu citrus products are known outside our local markets. WATTLE.

Dairy Farming has from the beginning played a prominent part in advancing the material welfare of Kyambu. In July, 1916, the number of cattle owned by Europeans in the administrative district was just under 6,500, while pigs numbered over 2,000. The number of native owned cattle is much in excess of European owned. Although the entire district is admirably suited to dairy farming, with green pasture throughout the year, it is only on the lower slopes and at the higher altitudes that the land is given over to stock, the intermediate area being deemed more valuable when put under such high priced products as coffee. DAIRY FARMING.

The labour supply necessary to carry on the industries briefly described above has been drawn chiefly from the Kikuyu native reserve in the vicinity, augmented by migratory labour from neighbouring reserves. But, as has been already stated, the full exploitation of Kyambu's enormous resources LABOUR.

will only be made possible by the scientific handling and control of native labour. When this problem has been solved, it is not too much to assume that the surplus products from the district will constitute no small proportion of the exports from East Africa.

W. MACLELLAN WILSON.

## THE SOLAI VALLEY.

DISCOVERY  
BY THOMPSON.

UNTIL the year 1883 the Solai Valley, in common with the rest of Masailand, remained completely a *terra incognita*. In that year it was traversed by Joseph Thompson—the first knight-errant to lift the veil from the then mysterious territory of the haughty Masai. Shortly afterwards, when help was being sent to Emin Pasha, the importance of the Masailand route to the headquarters of the Nile came into prominence, and General Gordon's estimate of it as the true route has now been amply proved by the construction and success of the Uganda Railway, which has opened up to civilisation the rich territory of the healthy highlands of British East Africa that include the Solai Valley.

THE VALLEY  
IN 1883.

Since 1883 the Solai Valley has emerged from a land of inviting mystery for the explorer, a paradise for game and a happy grazing ground for an indolent nomadic tribe, to a tolerably well settled outpost of our great Empire. Here it was that Thompson was probably referring to when in speaking of East Africa he said "the colonist will find new countries of promise." We can picture to ourselves the Solai Valley as he saw it. The rainy season would be well begun when he passed through park-like land of short verdant grass bespread with the umbrageous albizzia, the ever-green acacia and the silvery leleshwa; broken by numerous crystal-clear streams—a land where the elephant, rhino, buffalo and lion still held sway, and the only human population consisted of natives whom he considered were of low development. Could he recross "that bourne from which no traveller returns" and revisit this part of Africa, the intrepid explorer would bless the day he wrote that letter to the *Times* thirty years ago, pointing out that



East Africa might be a new ground for colonisation—for the Solai to-day is a valley of industrious colonists, beautiful estates and happy homes.

Instead of the lethargic Masai, Thompson would see the formerly despised Kavirondo, Walumbwa and Wakikuyu engaged in such modern pursuits as ploughing, driving maize planters, planting, pruning and harvesting coffee, butter-making and budding fruit trees—in fact, engaged in all pursuits connected with planting, farming and grazing, which only a short space ago were considered beyond their capabilities. Instead of the narrow, tortuous path frequented only by the native trader and the proud moran, he would find a comparatively modern road, motor cars containing colonists with, mayhap, their wives and children, and buck-wagons carrying to rail the produce of a fertile land. In place of the squalid manyatas of the Masai he would behold the neat dwellings of the white settlers—the trim gardens, fruitful orchards and plantations, the wide acres of maize and flax, breaking the monotony of virgin veldt. Instead of bovines browsing lazily in an unprogressive land he would behold the patient, plodding ox inspanned in plough, in harrow, in wagon and reaper, preparing the land and garnering a valuable harvest to be sent over an iron road hundreds of miles to the coast and thence over thousands of miles of ocean to feed and clothe the people of the homeland; fruits of the labour not only of the surplus youth of the homeland, as Thompson had pictured, but also of men from all the corners of “that Greater Britain which is beyond the seas.”

The Solai Valley is part of the great Rift Valley. It has for its railway station Nakuru, which is a rising township having a hotel, two banks, post and telegraph office, several good stores, a school, churches, sports club, etc. All the land in the Valley is above the 5,000 feet level. The average rainfall near the hills on the eastern side is about 50 inches, and the climate is equable and pleasant. The Valley lies partly in the two hemispheres, the equator running through the northern end.

For the purposes of this article the Solai Valley includes the land running from the Uganda

Railway east of Nakuru Township in a direct northerly direction to a few miles north of Lake Solai, or about 10 miles north of the equator. It is bordered on the east by the Laikipia escarpment, the southern portion having on its western side the extinct Menengai Crater, while the northern portion joins up with the Lower Molo district. The Solai district is situated almost exactly in the centre of the healthy Highland Zone.

#### SOIL.

To-day, with East Africa as a vigorous and prospering colony, the Solai is one of the most attractive centres, in which all the staple crops of the Highlands can be seen flourishing. Its soil ranges from ordinary black sandy loam and the richer loam of the elephant grass country to red sandy loam and the stiffer red iron soil typical of other parts of East Africa, and the climate varies in sympathy with the altitude.

The most predominant forage plant is the red grass (*anthesteria-imberbis*), and where heavy grazing has taken place this has been replaced by such valued forage plants as Rhodes and Rescue grass and the Ikoka of the Wakikuyu (*cynodon-dactylon*). *Paspalum dilatatum* grows in great luxuriance wherever it has been introduced, while ordinary cocksfoot, ryegrass, the fescues; crimson, alsike and white clover, trefoil, sainfoin, etc., all thrive on the sandy loams. The lower portion of the valley is famous among stock owners as being as good cattle grazing as can be found anywhere.

#### STAPLE CROPS.

All the red soil parts grow as heavy crops of coffee as any of the other coffee districts of East Africa, and both red and black soils produce heavy crops of maize, and the appearance of specimen plants of sisal augurs well for the future of the prospective sisal planter. The upper part of the valley, including the black sandy loam district, with its well-distributed rainfall, has been characterised as flax country *par excellence*, and crops of exceptionally high quality have been reaped. Black wattle flourishes, as also does sugar cane in some parts, and broom corn produces switches equal to the best Italian.

#### FRUIT POSSIBILITIES.

Some of the orchards in the Valley shew promise of its becoming a good fruit country. The black

sandy loam produces peaches, plums, figs, etc., in excellence, and here also succeed almonds, pears, citrus and apples. In the red soil all these do well, and in addition the more tropical fruits, such as mangoes, succeed. Here, where the presence of the leleshwa scrub denotes a more than usual lime content in the soil, apples thrive and fruit in a most extraordinary manner.

All the European vegetables succeed, including VEGETABLES.  
onions, on the sandy loams, and on these flourish such things as rhubarb, sea kale, asparagus, strawberries and raspberries.

It may be interesting here to note the wide EXOTIC  
PLANTS.  
range of exotic plants which have adapted themselves to the varied soils and climates of the district. In two neighbouring gardens one may see the cowslip, foxglove, daffodil, the English oak and the horse-chestnut, growing alongside the banana, the orange and pineapple. A row in the garden of one of the earliest settlers contains a coffee bush, European ash, sycamore, elm, walnut, English oak, the edible olive and a fig tree, while on the garden fences climb the sweet-scented honeysuckle, and on the house the ever-green ivy. Here under the equator one can rejoice in the possession of a purely English summer garden, for every English summer flower seems to flourish.

The parts adjoining the olive and cedar forest are peculiarly reminiscent of parts of Britain. Such common plants as the dock, stinging nettle, buttercup, St. John's wort, lobelia, thistle, the bramble or blackberry, bracken, forget-me-not, geranium, the wild violet and other familiar plants are found, and these, in common with the presence at certain seasons of quail, the lapwing, swallow and wild duck, combine to remind the colonist from home of "scenes in strong remembrance set"—youthful days in the old country.

The Solai Valley is a district where the planter, GENERAL  
the farmer and the pastoralist can succeed. It is a healthy and pleasant valley to live in. It is a very British part of the "Britain of the Tropics."

W. J. DAWSON.

## LUMBWA.

### POSITION.

THE settled district of Lumbwa, as distinct from the native reserve, consists of an extensive group of farms lying on either side of the Nyando River and clustering round the Township and Railway Station as a centre. The area comprises some 80,000 acres, and as several of the original large farms have been sub-divided there is in normal times a considerable European population. Just at present most of the men are away on active service.

### CHARACTER OF THE COUNTRY.

The country, although broken and hilly, contains a large percentage of ploughable land of the best quality. The scenery, with its variety of hill and dale, smiling valley and rushing river, has a picturesque beauty of which the eye never wearies.

### RAINFALL AND CLIMATE.

The average rainfall, as observed by the writer during the last ten years, is 42.5 inches, and is well distributed over the year. The climate, as in most other parts of the Highlands, is mild and equable, and appears to agree remarkably well with children. The altitude ranges from about 6,000 to 7,000 feet above sea level.

### WATER, TIMBER AND STONE.

It is well watered—much beyond the average—and a whole series of rivulets, some permanent, some less reliable, traverse each farm on their way to the Nyando. There is plenty of timber for farm purposes, and two saw mills are at work in the Government forest concessions close by. Excellent building stone is found throughout the district, and the majority of houses, and even outbuildings, are built of stone.

### STOCK RAISING.

Until recently, stock raising and dairying were the principal industries of the district, and rose to considerable importance. Cattle do remarkably well. Pure-bred bulls are exclusively used on many of the farms, and a considerable number of these and grade bulls from the annual Naivasha Government Farm sales find their way to Lumbwa, so that the quality of the stock raised is being steadily improved. On at least one farm a herd of imported cows has proved highly profitable, and is proving an encouragement to others to follow example. The favourite breeds for grading up are Shorthorn and Friesland.

The rapid development of the dairying industry led to the establishment in 1912 of a Co-operative Creamery at the Station, which has developed into a highly successful concern, with an output at present of six tons of butter and cheese monthly. It has proved a real boon to the neighbourhood, in that it provides the farmer with a ready market for his dairy produce and a sure return on his outlay. The Creamery is run on purely co-operative lines and belongs entirely to the suppliers, so that in addition to a fair price for his milk and cream the farmer reaps the benefit of all profits in the shape of bonus and dividend. A refrigerating plant will probably be added to the equipment of the Creamery in the near future. DAIRYING.

In recent years the production of flax has grown to seriously rival stock raising and dairying as the staple industry of the district. There are now two factories operating and others are likely to be erected so soon as it is possible to obtain the necessary plant. Considerable shipments of the cleaned fibre have already reached the London market, the quality being pronounced to be excellent, and the prices realised have given entire satisfaction. It is certain that the area devoted to this crop will be steadily extended. FLAX.

Horse and mule breeding has attracted considerable attention of late, and there is now a large number of mares in the district. HORSES AND MULES.

Pig breeding found much favour before the war, Lumbwa supplying the local market with an appreciable proportion of its supplies of first quality bacon. The proximity of the native reserve, from which in normal times quantities of grain suitable for pig feeding are obtainable at reasonable prices, and the constant supply of dairy bye-products, have their influence on the quality and cost of production, and enable the breeder to turn out a first class pig at a cost that leaves a fair margin of profit on the market price. Unfortunately the development of our export trade has been hampered by want of shipping facilities since the outbreak of war, and this combined with a diminution of food supplies from native sources (a very large number of the natives having joined up with the Carrier Corps), has checked the PIGS.

progress of the industry, but with a return to normal conditions these adverse circumstances will cease to operate. A further filip to the industry would result if the Pig Breeders' Association decide to erect in the Lumbwa district the new factory now under consideration.

**COFFEE  
AND CITRUS.**

The soil being so rich in parts and the climate so mild, it was inevitable that attention would be given to coffee. Although the crop takes longer—possible a year longer—to reach the producing stage than it does at lower altitudes, most of the farms have small experimental patches, and at least two have considerable acreages in full bearing. The weight and quality of the coffee are reported on as being satisfactory, and the area under this crop is being steadily extended. Citrus fruits of all sorts flourish, and production on a large scale is contemplated.

**SHEEP.**

Sheep so far have not done very well, owing no doubt to the heavy rainfall and the over luxuriousness of the grazing.

**LABOUR.**

Though some anxiety is at times felt in other parts of the Protectorate as to labour, there need be no uneasiness in the Lumbwa district, situate as it is surrounded by large native reserves, even if European development proceeds on a large scale. All that is required to ensure adequate supplies is a reasonable "Resident Natives Bill," and this we are likely to have in the near future.

J. W. CUSHNY.

## **FORT TERNAN.**

**SITUATION.**

**T**HE Fort Ternan district, situate on the Railway about mid-way between Lumbwa and Muhoroni, some 50 miles from the terminus at Kisumu, has only been opened up for European settlement within the past six years, but even during that short space of time it has made remarkable progress, and is rapidly becoming a factor of importance in the agricultural life of the country.

It is a rather hilly district, the altitude ranging from 5,000 to 6,800 feet. The temperature, which of course varies according to the elevation, seldom rises above 85 degrees Fahrenheit in the shade by day, or falls below 50 degrees by night. The scenery is very attractive, verdant green valleys with numerous streams marked by heavily timbered banks running between hills lightly covered with a variety of wattle. The climate is healthy: Fort Ternan being above the malarial belt.

CHARACTER OF  
THE COUNTRY.

The average annual rainfall is 64 inches; the rainy season lasting from April to September, with showers at short intervals during the remaining months of the year. The whole district is very well watered by numerous small but permanent streams, and many springs coming out of the hills, some of which continue to run all the year round. All the streams are swift, and have falls and rapids at frequent intervals, so that water power for plantation purposes is easily obtained.

RAINFALL AND  
WATER.

The soil in the valleys is extremely fertile. It varies somewhat in character, but is mostly deep loam, the forest land being particularly rich and well repaying the cost of clearing. Timber for rough farm buildings and fuel is in abundance.

SOIL AND  
TIMBER.

The labour supply obtainable from the adjoining Lumbwa Reserve and the Kavirondo Reserve within a days' journey, is more than adequate to meet the present requirements of the district, and should meet all the demands likely to be made on it for some years to come. The Walumbwa are always ready to come and "squat" on European owned farms, providing labour in return for the privilege. This is a cheap and convenient arrangement for the planter, as it provides him with extra labour at short notice in busy times, as for instance, during the coffee picking season, when a plentiful supply of labour is of the first importance. The rate of wages for squatters is Rs. 3/- per month for men and "posho" (food), the women and children working for food only. The rate of pay for casual labourers is Rs. 4/- to Rs. 6/- and posho. In addition to settlements of Walumbwa, there are also considerable numbers of Wakikuyu squatting on the farms under the same conditions.

LABOUR.

**GRAZING.**

Though the formation of the country renders it more suitable for agriculture, stock raising can be pursued with success, the excellent pasture on the hills maintaining cattle in first class condition all the year round. Cattle do extremely well, but sheep have not proved a success, the heavy rainfall and the rapid growth of the grazing being against them. Dairying has proved a good paying proposition, the Lumbwa Co-operative Creamery affording a ready market at remunerative prices for milk and cream. The Walumbwa are good herds, and prefer looking after stock to most other useful occupations.

**STAPLE  
PRODUCTS :  
COFFEE.**

So far the two principal crops that have been thoroughly proved in the district are coffee and maize. The prices realised on the London market for Fort Ternan coffee are as high as the average for East Africa, and the planter can reckon on half a ton to the acre after the third year. There are now about 700 acres under coffee in the district, and the area is being steadily increased.

**MAIZE**

On an area of particularly good and well cultivated land as much as twenty six bags of maize to the acre has been reaped. This is exceptional, and is mentioned as testimony to the productivity of the soil rather than as illustrating what the maize grower may expect. With ordinary good farming, fifteen bags to the acre may be expected, which is still high, and well above the average for even good maize growing districts.

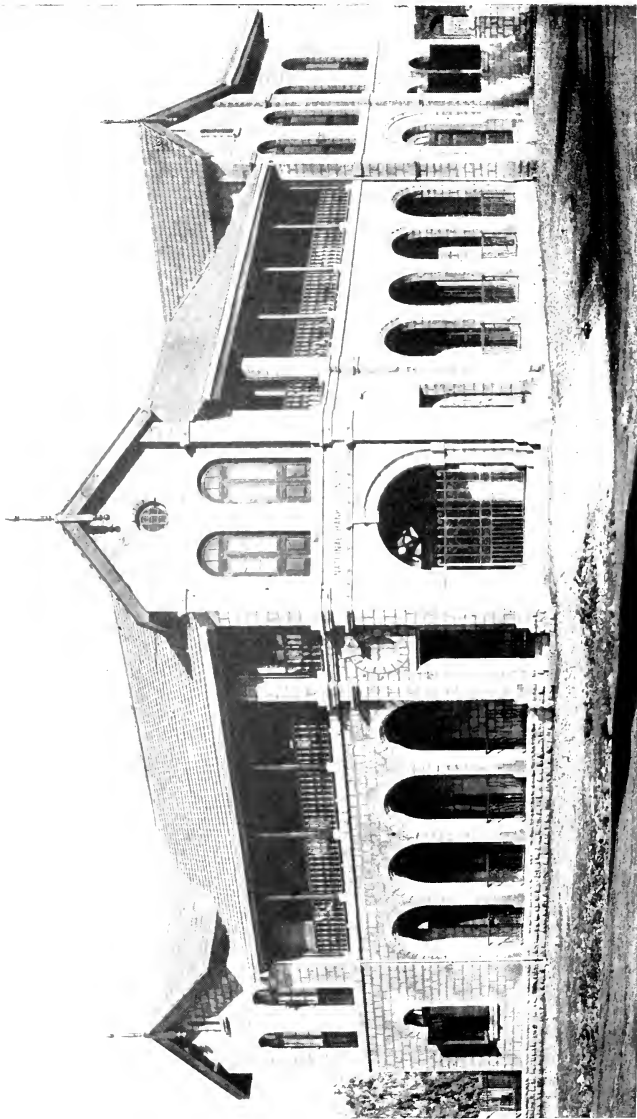
**CITRUS AND  
FLAX.**

Experimental patches of citrus fruits are common, and are doing so well that further development in this direction is likely. Flax of excellent quality has been grown in the adjoining district under similar conditions to those existing at Fort Ternan.

**GAME.**

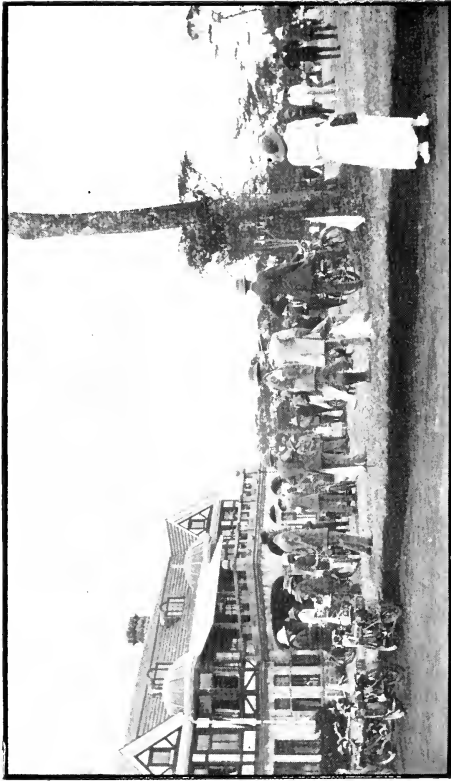
The farmer has nothing to fear from the presence of game and suffers very few losses from wild animals. As a precaution against stray leopards, small calves are housed at night, but with the exception of a few wild pigs and monkeys, the only game are small antelope, which do no harm, while providing a welcome addition to the larder when opportunity offers to procure one.





THE NATIONAL BANK OF INDIA, LTD., NAIROBI.

*Photo by W. D. Young,*



*Photo by A. C. Barnes.*

**A GALA DAY AT GOVERNMENT HOUSE.**

Almost all the vegetables common in England do remarkably well. Oranges, lemons, figs, mulberries, paw paws, pineapples, grenadillas (passion fruit) and bananas are common in every settler's garden, while apples, peaches and plums are also grown, but have not sufficiently matured to bear fruit in any quantity.

VEGETABLES  
AND FRUITS.

Compared with the older coffee planting districts around Nairobi, the price of land at Fort Ternan is low, and although it has been rising at an average rate of ten shillings per acre annually during the past few years, it is still very much below its intrinsic value when its revenue producing capabilities are taken into consideration. If for no other reason than this, Fort Ternan would be certain to attract attention from prospective settlers, but when comparative cheapness of land is combined with delightful scenery, an excellent climate, fertile soil, and abundant rainfall, something more than passing attention is assured.

PRICE OF  
LAND.

M. PRICE.

## UASIN GISHU.

**T**HE Uasin Gishu Plateau is situated to the north-west of Londiani between the Burnt Forest on the south, the Nzoia River on the north, the Algao Reserve on the east and the Nandi Reserve on the west. It is about 20 miles across from Nandi to Algao and 40 from the Burnt Forest to the Nzoia River.

SITUATION.

The altitude of the Plateau varies from about 6,000 to 7,000 feet. The climate is very pleasant and healthy. It is seldom too hot, and though fires are welcomed in the evening it is more for the sake of appearance than for comfort. Sixty inches is about the average annual rainfall, and though the greater part falls between March and September, it is on the whole well distributed throughout the year.

CLIMATIC  
CONDITIONS.

In the matter of communications the Uasin Gishu district is still far from favourably circumstanced. Londiani, with which the Plateau is connected by road, is the nearest point on the Uganda Railway, but a new line has been surveyed from

COMMUNICA-  
TIONS.

Nakuru to Mumias which will cross the Plateau and place stations within easy reach of most of the farms.

**TRADING CENTRES.**

The principal trading centre of the district is Eldoret, situate 64 miles from Londiani. It has several up-to-date stores, a good hotel, a bank and a Government school. The township is pleasantly situated on the Eldore River; building stone is plentiful and good bricks are made in the neighbourhood, and timber is cheap. There are branch post offices and stores at Sergoit and Soy, the latter place being a trading centre of some importance.

**SOIL, WATER AND TIMBER.**

As might be expected over such a large stretch of country, the soil varies considerably, that most suitable for agriculture being the rich sandy loam of which many of the farms are composed. This land usually carries considerable growth of scrub, which, however can be cleared at a cost of less than ten shillings per acre. It is then easily ploughed and brought into cultivation. Water is plentiful and good, most of the farms being served by several fine streams.

**LABOUR.**

Labour is at present ample, and consists of Kavirondo, Kakemega, Kitosh and Wa-gishu. Nandi make good herdsmen and can be obtained for certain other classes of work. The current rates of pay are from 2s. 8d. to 6s. 8d. per month with posho.

**STOCK.**

The farms to the south and east of Eldoret are particularly suitable to cattle. There are already many fine herds in the district, and sales are frequently held at Eldoret, which provide opportunities of securing the foundations of a herd at reasonable prices. The many advantages of dipping are generally recognised. A number of dips are already in use, and others are in course of construction.

Horse-breeding has long been regarded as offering great possibilities, and were it not for the prevalence of lymphangitis would be more generally pursued. The number of horses on the Plateau is steadily increasing. Several high class stallions are available for the use of those possessing mares, so that once lymphangitis has been eradicated the breeding of horses should prove highly remunerative.

In some districts sheep breeding is making steady headway, and where maintained in sufficient numbers to keep the grass short sheep are proving successful. Pigs are being kept in increasing numbers, sufficient to justify the erection of a bacon factory.

Maize is growing in varying quantities on practically every farm. Yields of 20 bags per acre and even more are obtained, and notwithstanding the heavy cost of transporting to Londiani can be disposed of at a fair profit. When the new railway is running, maize should be a source of steady income, besides providing the newcomer going in for coffee or citrus with a means of reducing his working costs while waiting for his plantation to reach the productive stage. **MAIZE.**

During the past few years the cultivation of wheat has assumed considerable importance, and many farmers are producing large quantities. The Plateau compares very favourably with any other part of the Protectorate as a wheat country, as regards both yield and quality. On some farms rust has proved troublesome, but as the result of government and private experiments rust resisting varieties of seed are being found, and it should be only a matter of a few years when the Uasin Gishu Plateau is producing wheat on a very large scale. Wheat growers can obtain the use of a threshing machine from Soy and can, if they so desire get their wheat converted into flour at the same place. **WHEAT.**

Though the appearance of flax on the Plateau is very recent, it already bids fair to outstrip all other crops in popularity. One factory is already operating, two others of large capacity are at the time of writing nearing completion, while several others are in course of construction. This is sufficient evidence that growers are perfectly satisfied with the prospects ahead of them. Sample shipments sent to England have been most favourably reported on, and realised £115 per ton. **FLAX.**

So far none of the diseases met with in other coffee producing areas of B.E.A. have appeared on the Plateau, and though these may not have proved serious in the parts where found it is as well to be without them. The larger part of the Coffee area of **COFFEE**

the Plateau is situated along the Nandi border and up the Nzoia valley. Here one may see blocks of 200 acres and upwards of healthy young coffee, much of it already bearing. The growth is rapid, the crops heavy, the berry of good size and excellent quality. Samples sent to England for report are said to be superior to Nairobi sorts. A great asset of the coffee planter is the long planting season which extends from March to September. It is expected that an up-to-date curing factory will be built shortly.

**OTHER  
CROPS.**

Citrus fruits are doing well, and there is likely to be considerable development in this direction in the near future. Sisal is being planted on a large scale by at least one farmer, and gives great promise. Wattle makes remarkably rapid growth, and the low cost of planting should induce those thinking of going in for wattle to try the Plateau. All the usual tropical fruits do well, and many of the temperate kinds, such as peaches, plums and apples are producing crops. Potatoes, turnips and practically every variety of vegetable common in the home countries can be grown with little trouble.

**THE FUTURE.**

Agricultural development is really only just commencing on the Plateau. But comparing the amount of land now under cultivation with that of three years ago, the increase is most remarkable. The transport riders are all busy; every wagon going out is loaded high with wheat, coffee and other produce, returning with large quantities of machinery, empty sacks and other necessaries for the farmer.

S. O. HEMSTED.

## KERICHO.

**K**ERICHO, situated between the Lumbwa and **SITUATION.**  
Sotik country, about 20 miles south-west of  
Lumbwa Station, though not a separate administrative  
area, is nevertheless distinct from the neighbouring  
white settlements of Lumbwa, Fort Ternan, Koru and  
Sotik, as regards soil, vegetation and climate. It is  
probably less known than some of the districts men-  
tioned because of the smaller number of farms under  
European cultivation, and the large areas of Crown  
lands lying waste, or only sparsely populated by  
natives. As considerable portions of this presently  
waste land should become available for settlement  
later on, Kericho is well deserving of attention from  
the new comer.

The country is more like Kikuyu than any other **TOPOGRAPHY.**  
of the well known districts, in that it consists of  
rolling hills of immensely deep red soil, intersected by  
frequent rapid streams lying in narrow forest clad  
valleys. The altitude is also about the same as that of  
Kikuyu—6,500 to 7,000 feet—but the rainfall is  
greater and better distributed, and is further distin-  
guished by the rarity of rain occurring before noon, as  
is perhaps generally the case on the western slopes  
of the Mau. On account of the rain falling in the  
afternoon, Kericho may have earned an undeserved  
reputation for exceeding wetness, from the  
fact that travellers from the Station arrive here  
in the afternoon. The good rainfall, is, on the con-  
trary, a great asset to the planter—the mornings being  
dry, work is not unduly interrupted—and on account  
of this well distributed rainfall, growth is most prolific  
and planting greatly facilitated.

It is almost obvious that at this altitude, with its **CLIMATE.**  
cool nights (the annual mean temperature is 51.5)  
fever is quite unknown, and the district is second to  
none in the country from the health point of view.  
And yet this climate, which permits of Europeans  
working out-of-doors all day, has now been proved  
to be suitable to coffee, in spite of the doubts cast  
upon the enterprise in its early stages. As might be  
expected, coffee comes into full bearing rather later  
than in more tropical climates—at 3½ years old from  
seed it only bears a small crop, but in the following

seasons bears heavily. The oldest coffee in the district has now reached this stage, and is giving over half a ton to the acre.

#### PRODUCTS.

Besides coffee, the district seems exceptionally suitable for citrus fruits and tea—both of which are doing exceedingly well on a small scale. The district is too young to have made much progress in fruit growing as yet, but what fruit trees there are, are doing well—even so tropical a fruit as the pine-apple gives good though not large fruit. Of course flax has its devotees in the district. The fibre is of excellent length, but its quality remains to be tested on the market.

Maize growing and grinding is a source of profit to most of the settlers while awaiting the maturing of their plantations. There are five mills in the neighbourhood.

The short green grass and absence of horse sickness should make it an excellent place for horse breeding; but with only a handful of settlers in the district little progress can be made in the many potential industries. It is, however, to be hoped that the day is not far distant when much of the land available for white settlement will be given out by the Government. Land sufficient for 50 or more farms of 500 acres each exists 16 to 30 miles from Lumbwa Station, and is situated near one of the best roads in the country.

#### PROSPECTS.

In conclusion, the Kericho district combines the two chief requisites—Productiveness and Health, and has the further advantage of the proximity of the Lumbwa Native Reserve, which ensures an adequate labour supply. If the district were only opened up to white settlement, there seems splendid prospects for the development, besides coffee, of tea, citrus, and flax on the co-operative system.

I. Q. ORCHARDSON.



## THE SOTIK.

**T**HAT portion of the Sotik country which has been open to settlement for some years is confined to a narrow belt of 5,000 acre holdings lying about 50 miles south of Kericho and south of the Lumbwa Reserve, bordering on the Chepalungu Forest and the Indanai Hills. It is only in recent years that any serious effort has been made to settle the district: since 1912, when the farmers with the help of a financial grant from Government constructed a wagon road from Kericho to Sotik Post, a distance of 50 miles, and two branch roads bridging close on twenty rivers and streams in the task.

SITUATION.

Like most other parts of the country with an altitude of 6,000 feet, the climate is delightfully healthy and bracing. The average annual rainfall since 1911 has been 51 inches, spread over 185 days in the year. Even during the heaviest rainy season it is seldom that any falls before the afternoon, which greatly facilitates work.

CLIMATE.

The country was originally surveyed for grazing farms, but the district being an endemic East Coast Fever area, and so far removed from the Railway, as to make the cost of building and maintaining dips very difficult, comparatively little attention has been given to stock. The native herds shew of what the country is capable. Trek oxen from the Sotik are in keen demand among the European settlers throughout the Highlands, being strong, hardy animals, and they provide evidence of the suitability of the country for stock raising on a large and progressive scale. At present, while the farmers are developing their coffee plantations, the grazing is mostly left to the herds of the native workers.

STOCK RAISING.

Occurring in strips and patches and bordering the streams, are areas of good arable soil of deep red and chocolate loams, suitable for a great variety of crops, including coffee. Three or four coffee plantations are now coming into bearing, and the vigorous appearance of the trees and the heavy crops are sufficient evidence of the suitability of the soil and climatic conditions. No disease of any kind has made its appearance, and the ample sunlight and cold nights will probably keep off any danger of that kind. Some of the

COFFEE.

**GENERAL  
CROPS.**

planters have cleared heavy forest for their plantations, while others have taken the lighter scrub land on the red soil, but the coffee appears to thrive equally well on either. It is the local custom to raise maize as a catch crop between the young coffee trees, and quite big returns have been reached. A ready market is found locally among native traders at prices equal to those ruling at Railway centres. An experimental crop of wheat yielded 40 bushels per acre. Citrus, apples, peaches, plums, figs, pineapples, paw paws, bananas and several other fruits are all being successfully grown, while every farm has its patch of delicious strawberries. Flax has been experimented with on several farms and proved quite a success. Sugar also is being grown experimentally and promises well.

**HORSE  
BREEDING.**

Horses are likely to be a feature of the district in the future. They have thriven for the past ten years, and there seems to be no disease. Some nice South African brood mares have lately been imported, and are doing excellently.

**THE FUTURE.**

With the extension of roads and general opening up of the district it is inevitable that the Sotik will receive considerable attention. The land next for survey, the Indanai hills, adjoining the Sotik in the direction of Kisii, is among the richest in the Protectorate if not in the world, and a great deal of it is suitable for small holdings. The wonderful scenery of the Sotik is probably the feature that impresses itself on most people on their first visit. The wooded hills and beautiful parklike plains, interspersed with belts of forest fringing the rivers, make the views exceptionally attractive, especially when viewed in the brilliancy of the morning sunshine.

T. MORGAN.

## RONGAI VALLEY.

**T**HE Rongai Valley, in the Naivasha Province, SITUATION. situated some 15 to 20 miles north of Nakuru, at an altitude of 5,500 feet, is composed of undulating plains, lightly covered in places with thorn trees. The district is extremely healthy, and free from malarial fever.

The soil ranges in many varieties from black SOIL. cotton to a sandy loam, most of it being of volcanic origin and very fertile. It is easy to work, and as an instance of its fertility the writer may mention that he has seen a field from which eleven crops of maize have been taken in eight years, which is still returning 10 bags to the acre without manuring of any sort.

The average annual rainfall, taken over the past CLIMATIC three years, is 38.66 inches. The heavy rains last CONDITIONS from March to September; the light rains start in November and finish about the middle of December. The best months for ploughing are May to August, though the work may be carried on all the year round. The average maximum temperature is 76.5; average minimum 54.8. The weather conditions may be likened to those of an ideal English summer.

The main wagon road runs from Nakuru Station COMMUNICA- through the centre of the valley; while there is also TIONS. a branch road to Njoro Station, both of easy gradients. The surveyed route of the proposed Nakuru-Mumias Railway crosses the valley, so that when this line is built most of the farms in the district will be within easy distance of a railway.

The valley is well watered by the Rongai River, WATERWAYS. which, rising in the Elburgon Hills, flows through the centre of the valley; and also by numerous small streams.

Labour is very plentiful, the supply being drawn LABOUR. from several tribes, notably the Wakikuyu and Kavirondo, while in recent years Walumbwa from the Kericho district have been supplying an increasing proportion, and prospects in this respect leave no cause for complaint. The wages paid are from five to six rupees for Wakikuyu and Walumbwa, and six to eight rupees per month for Kavirondo, with food, equivalent to a further two rupees.

**CROPS :**  
**MAIZE.**

There can be little doubt that in the future this district will be known as the Granary of East Africa. The largest and most useful crop grown is maize, under which there are about 7,000 acres, producing about 77,000 bags. New land gives about 8 to 9 two hundred pound bags to the acre; old land 12 to 14. With the establishment of the B.E.A. Maize Growers' Association, the prospects of export trade have been materially improved, and it is extremely probable that in the near future the area under maize will be greatly extended.

**WHEAT.**

An increasing acreage is being put under this crop every year, and last year's returns shew an average of 17 bushels per acre. This is sufficient evidence that the district can hold its own in wheat. This year the area under it will be doubled. Local markets will consume all the country is likely to produce for some years yet—as is evidenced by statistics—so that growers have an assured market at their doors.

**BEANS.**

Beans in large quantities are grown, the favourite varieties being Noyau-au-Blanc, Canadian Wonder and Rose Coco. All of these give good yields, and find ready markets at profitable prices, both locally and overseas. Beans, not being affected by drought to the same extent as most crops, are well deserving of attention as a side line.

**WATTLE.**

There are over 3,000 acres under wattle in the district, and the area is being steadily extended. The two rainy seasons per year, and other favourable climatic conditions, have the effect of bringing the trees to maturity in three or four years instead of the six or seven usual in most wattle growing countries. Samples of 3½ year old wattle from the district, sent to the Imperial Institute some time ago, were stated to contain 39.6 per cent of tannin, and reported to be of readily saleable value. Before the outbreak of war a scheme was on foot to erect a tannin extract factory at Naivasha, capable of handling seven to ten thousand tons of bark per year. Should this or some similar scheme be gone on with on the return to normal conditions, wattle growers in the district should reap a handsome return on their outlay of capital.

The acreage under this most valuable crop is being added to yearly, and in a short time the Rongai Valley coffee will be known on the home markets by its distinctive bean. **COFFEE.**

The output of citrus products from the Rongai Valley is likely to be considerable within a few years. The acreage under citrus is being rapidly increased, and prospects are most encouraging. Trees bear very heavily, and so encouraging have been the results obtained so far, that settlers are giving this crop increasing attention, and an extracting factory is already being talked of. **CITRUS.**

Great interest is being taken in this crop in the district, from which tobacco has already been put on the market, with good results. Messrs. Armstrong Bros., who took first prize for their tobacco at the last Nakuru Agricultural Show, and whose cigars are favourably known on the local markets, have erected a modern flue barn for the curing of their crops, and their success is proving a powerful stimulant to the industry in the district. **TOBACCO.**

Flax, Soya Beans, Ground Nuts, Cotton, Tea, Up-land Rice, and numerous varieties of fruit and timber trees are all being tried, many of them with great success. These help to open out a wide field of choice products to be grown by the incoming settler. **MISCELLANEOUS CROPS.**

The grazing of the Rongai Valley is composed of Tall Oat grass, Rhodes grass, couch and another creeping variety, which seem to make up an ideal ration for cattle. In no other part of the country has the writer seen cattle do better. Even oxen that are being continuously hard worked not only keep fit, but fatten, with no other feed than the wild grasses; and stock from adjacent hills sent down to the Valley when grazing there is scarce shew wonderful improvement in a month or two. Owing to distance from the Railway dairying is only carried on in a small way at present, but is capable of considerable expansion. Pigs do well, and can be raised at small cost, so that when an export trade is established the district should be able to supply its quota. **STOCK AND DAIRYING.**

## GENERAL.

The intending settler should understand that, in the Rongai Valley, as elsewhere, the personal factor is an important consideration in farming. Even the best of land will not give the same return for bad as for good cultivation. The man who contents himself with giving his labourers the seed to plant, and returning in time for the harvest, must not expect the best results. On the other hand, one need not have been engaged in agriculture all one's life to make a successful start. Some of the crops grown—maize and beans for instance—require no great expert knowledge, and can be made to pay general expenses while experience in other and more profitable lines is being gained. In no other country that the writer knows of can a man of moderate means take up farming with such prospects of success. Taking into consideration the variety and value of the crops it can produce, the cost of land is low, though steadily on the increase; it can be brought into bearing at the minimum of outlay, and the revenue derivable from its products, at present market values, enables one to recover the initial cost of the land and farm implements within two years from making a start. This is not theory, but practical experience; and is the source of the high opinion held of the Rongai Valley

J. BROWNE

## MOLO.

### SITUATION.

THERE is, unfortunately, a constant confusion of the Molo and Molo River districts in the minds of many, and it is to be regretted that such similar names were given to two such dissimilar districts. It is to be understood that the following notes refer to the Molo district, which gives its name to the Railway Station in the vicinity.

### CLIMATE.

Molo is generally recognised as one of the healthiest spots in the East African Protectorate, with a climate more like that of England in summer time than any other. The days are warm and the nights always cool, an advantage not always found in tropical countries. The rainfall is about 50 inches, and is well distributed throughout the year.

Mornings are fine as a rule; rain only starting about mid-day.

The land rises in rolling hills from 8,000 feet at the Railway Station to about 10,000 feet above sea level at the back of the district, which is pre-eminently suited to stock and dairy farming, though European cereals of all sorts may be grown with success, as also vegetables. The land is well watered with permanent and shady streams, which for the most part have a rocky bottom. The district is shut in by forests, and has no native reserve in close proximity. This, from the stock farming point of view, is an important consideration, as though a valuable adjunct to a plantation or an agricultural district, a native reserve may prove a serious menace to a stock country owing to the liability of native stock carrying disease into the settlers' herds. The supply of native labour is, however, ample for the needs of the farmers.

GENERAL  
FEATURES.

At Molo, the Caravan Road runs with the Railway. There are two cattle dips close to the road and others at the back of the district. Practically all the cattle in Molo are doubly inoculated for rinderpest, and only immune beasts are used for station transport work, so that the risk of any serious outbreak of infectious disease among cattle is reduced to the minimum.

STOCK DISEASE  
SAFEGUARDS.

It is indeed a treat to visit the farms here and see the herds of grade cattle and sheep. Molo being so excellently adapted to dairy work, the majority of settlers are crossing the native cattle with the recognised milk breeds, and of these the Shorthorn easily leads the way in local favour, though there are advocates of the Ayreshire, while the beef breeders use the Hereford. The high quality of Molo grade stock is borne testimony to by the fact that many down-country breeders pay high prices for it, and many head leave the district each year. Pure bred bulls of high quality, and in many cases animals imported from England, are in use on the farms. A few of the settlers have imported pure bred cows and heifers, which are doing very well, and fully justify the high expectations of their owners.

DAIRYING AND  
STOCK  
RAISING.

**DAIRYING.**

The dairy produce of Molo is well known on the local markets. Butter in large quantities is produced, while cheese, of both the blue veined and soft French variety, is being turned out in steadily increasing volume. Cream is also sent to the Co-operative Creamery at Lumbwa.

**GENERAL FARMING.**

Horses thrive, and the district has produced many winners at the Nairobi and Nakuru race meetings. There have been one or two outbreaks of horse sickness, but these have not seriously affected the horse breeding industry. Sheep do excellently on the veldt when once it has been eaten down. Wool is the chief object of the breeders, though Molo mutton has its place in the local markets. The breed mostly favoured for crossing with the native is the Merino, and the wool already exported has been very favourably reported on and fetched good prices. Pigs receive their share of attention, as is only to be expected in a dairying district, and the fat pigs sent away have the reputation of being among the best turned out in the Protectorate. Bacon, eggs, poultry and garden produce are also distributed from Molo Station.

**MAIZE, WATTLE AND FLAX.**

A variety of maize has been found which will ripen at an altitude of 9,000 feet, but its success as a field crop has not yet been established on an extensive scale. Black Wattle is being grown in Molo and trial samples have been submitted to analysts who reported them to be of exceptional quality for the age of the trees from which the bark was taken. Flax has also been experimented with and promises well. There are two up-to-date and progressive saw mills in the district, which not content with helping to supply local requirements were, prior to the outbreak of war, testing overseas' markets.

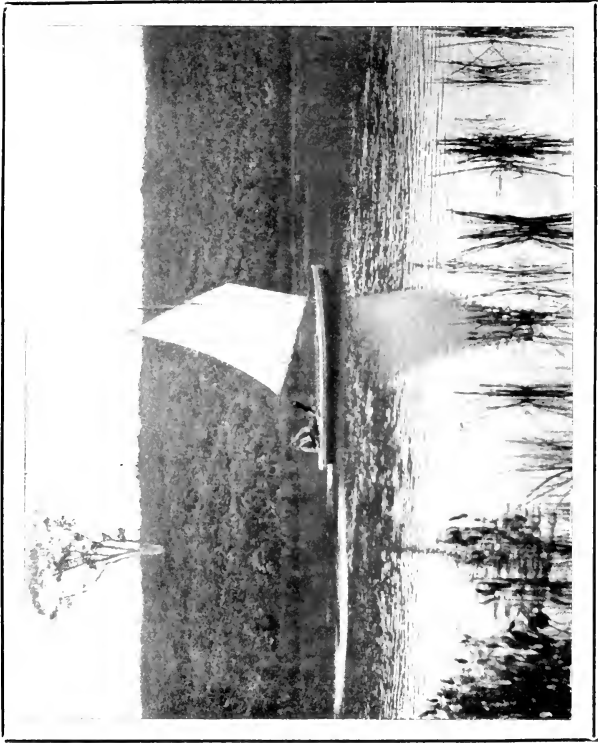
**BUILDING MATERIALS.**

Building materials are plentiful. Good stone is to be found on almost every farm, while excellent bricks can be made in places. For the less ambitious there is a plentiful supply of cedar, which, when split, makes very comfortable and picturesque houses.

**AVAILABLE LAND.**

The amount of land in the district at present available for new comers is rather limited. There are a few surveyed farms for sale, but much larger areas





*Photo by W. D. Young.*

**BOATING ON AN ARTIFICIAL LAKE.**



*Photo by Lieut. Col. R. J. Stordy.*

**ALBOLOSAT SWAMP.**

are in the hands of private owners, and on the willingness of these men to sell their surplus holdings largely depends the future progress of the district.

If they do so, much of the land that is at present lying waste would be profitably utilized for the benefit of the individual and the country alike, and it is to be hoped that owners will be induced to either make use of the land themselves or sell it to others who are prepared to do so. If this is done, the Molo district will certainly become of considerable importance as a stock and dairying centre.

ROBERT B. CURWEN.

### LIMURU.

**T**HE Limuru district, which lies north-west of Nairobi, between Kyambu and the Railway line, comprising, roughly, the upper ridges of the Kikuyu hills, was among the first to attract European settlers. To some extent on that account, but more because of the healthy climate, extremely rich soil, excellent water supply, and delightful scenery, it is one of the most closely settled areas in the Protectorate. SITUATION.

The farms were originally a square mile in extent, freehold for the most part, but many of them have been sub-divided into smaller areas—Limuru being one of the few districts where holdings of about 100 acres are met with. This is made possible by the innumerable perennial streams flowing through the valleys between the ridges. Malarial fever among humans, East Coast fever among cattle and horse sickness among horses, are unknown in the district. A HEALTHY DISTRICT.

In the higher reaches of the hills—running from 6,500 to 8,000 feet—most of the cultivated land is under wattle. At the lower levels coffee is doing well; and the area under this crop is being steadily increased. Although slower in reaching the productive stage, coffee suffers less from disease at Limuru than at lower altitudes, and it is now being generally conceded that the higher the altitude at WATTLE AND COFFEE.

which coffee can be successfully cultivated the less the chances of such a visitation of disease as ruined the industry in Ceylon.

#### DAIRYING.

Enjoying as it does a plentiful supply of good water and excellent green pasture all the year round, Limuru makes a strong appeal to the dairyman and stock breeder. Ranching on a large scale is hardly possible because of the comparative dearness of land, but for dairying no portion of the Protectorate enjoys greater advantages. A daily train enables one to send milk to the Capital: any surplus can be profitably turned into butter or cheese—for which Nairobi supplies a constant market.

#### FRUIT AND MARKET GARDENING.

Since its first tin shanties began to dot the plains, Nairobi has depended on Limuru for the greater proportion of its fruit and vegetable supplies, and market gardening has already begun to figure as a source of revenue in the district. Fruit growing, too, is receiving attention. Nearly every farm has its orchard. Deciduous fruits, no less than citrus, do extremely well, and in the normal course of development Limuru should figure prominently in the fruit exporting districts of British East Africa.

#### HORSE BREEDING.

Its wonderful suitability for horse-breeding is regarded by many as among the greatest assets of the district. For many years past the industry has been pursued on a small scale, and no disease of any kind has ever been contracted in the district. Horses do remarkably well—maintaining perfect health and condition on the natural grasses alone, it being necessary to supplement this feed with corn only when they are doing exceptionally heavy work.

#### PIG BREEDING.

In a country where feed is so plentiful and cheap, it is only to be expected that pig breeding would receive its share of attention. Pigs can be reared at extremely low cost. Owing to the equable climate expensive housing accommodation is not required; from the time the youngsters are weaned until it is time to finish them off little more than grazing on the rich grasses and clovers of the district is necessary, and for the final stages of fattening, potatoes, maize, and barley are obtainable cheaply. There is a bacon factory in the district and

another on the Railway a few miles higher up the line, while Nairobi provides a ready market for porkers.

Lucerne has been grown at Limuru for the past LUCERNE. ten years without irrigation, and in ordinary seasons six crops are taken off in the twelve months. The average yield has been  $1\frac{1}{2}$  tons per acre per annum, for which there is usually a good market at about £4 per ton. Of course, if the lucerne fields were irrigated the return would be more than doubled, but lucerne is such a valuable fodder that it could never prove an unprofitable crop for the farmer.

Although owing to the hilly nature of the CEREALS. country, the cultivation of cereals in the district on a large scale is impracticable, wheat, oats, barley and rye have been grown successfully on small areas. The two former are subject to rust, and—until such time as experiment results in the evolving of varieties of seed more suitable to local conditions than those at present available—they can only be cultivated on the same land once. Barley and rye are not attacked by rust to any extent.

Linseed has been grown successfully for the FLAX. seed, but it is too early yet to speak on the quality of the flax. Small experimental patches have given fibre of very promising quality. It yet remains to be seen, however, whether the district is suited to the production of flax on a commercial scale.

Limuru has been well known for some years POTATOES. past as a potatoe producing centre, the quality and yield being well above the average. An export trade with South Africa was started, but was greatly hampered by the want of storage and shipping facilities, and progress in this direction can not be looked for until, after the cessation of war, it is possible to proceed with the several Government schemes for improving the country's export trade facilities.

Limuru is one of the few districts in British TEA. East Africa where tea has been tried. As far back as 1903 a nursery was started by the late Mr. G. W. L. Caine with seed of the Manipur hybrid type.

**PROSPECTS  
OF TEA.**

From the result of the first sowing it was evident that the soil and climate suited this plant, and about two acres of land was cleared for the purpose of making a small plantation the following year, but the season proved unpropitious and a number of the plants died. Notwithstanding this, some 500 trees of this experiment are in evidence to-day, and stronger, healthier or more luxuriant trees one could not wish to see. In 1908 a sample plucking was taken from which tea was made and sent to the Imperial Institute. This and a further sample sent to a firm of London brokers in 1911 were, taking all the circumstances into consideration, very favourably reported on, and there can be little doubt that Limuru, as well as other parts of the Protectorate, is suited to the cultivation of the tea plant. Doubtless had not coffee come so rapidly into public favour, greater attention would have been given to tea, but it is only a matter of time when this extensive and highly profitable industry will be added to the long list of revenue producing activities that make Limuru one of the most attractive areas of European settlement in British East Africa.

W. H. CAINE.

**NAIVASHA.**

**SITUATION.**

Sixty-four miles by rail from Nairobi, and fifty-eight from Nakuru, Naivasha Station represents the "half way house" between the two leading Highland centres, and is, in itself, a place of first importance to East Africa.

**NAIVASHA  
TOWNSHIP.**

Naivasha Township, at an altitude of 6,200 feet above sea level, lies at the foot of the Aberdare Range, and commands magnificent views of the surrounding country, and the crater lake from which it takes its name.

Post and Telegraph Offices, a good hotel, well stocked stores, a butchery and bakery, provide for domestic and business needs, while social and sporting amenities are represented by tennis, golf, duck, partridge, pigeon, and big game shooting.

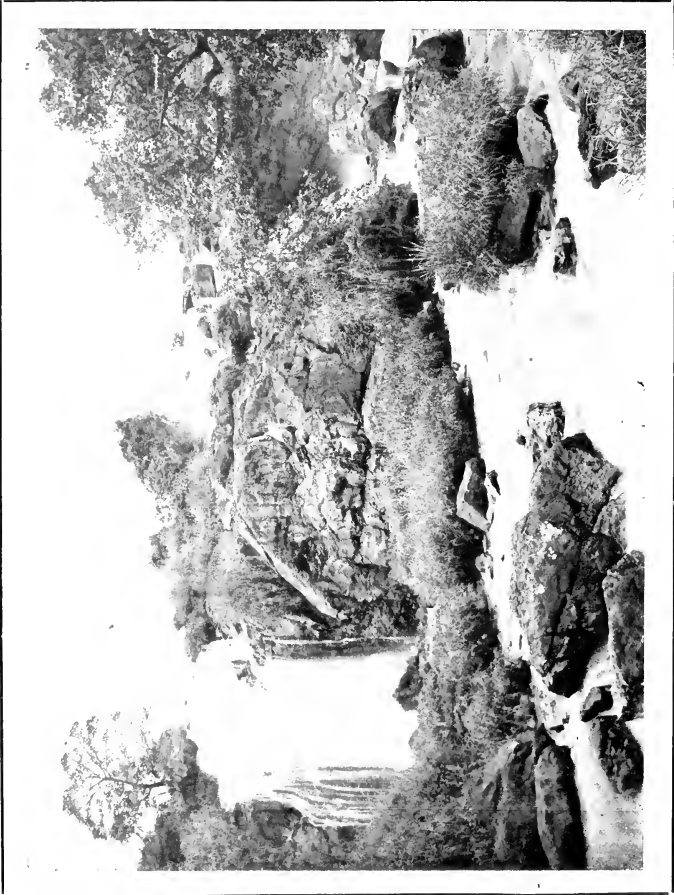
**THE LAKE.**

The Provincial and District Commissioners are in residence here, and other Government offices,



*Photo by Gleiman.*

**ON THE LIMURU ROAD.**



*Photo by Lieut. Col. R. J. Sturdy.*

**THIKA FALLS.**



such as the Public Works Department, the E. A. Police, Medical and Veterinary Officers, etc., are also represented.

Naivasha Lake is almost round, being roughly 12 by 12 miles. Feathery papyrus, nodding bull rush, and graceful reeds form a perfect setting for myriads of blue, pink, and white water lilies. The limpid waters of the lake reflect on their placid surface the rugged peaks of Longonot, the forest clad slopes of the Mau Escarpment, and the Aberdare Mountains, with giant Kinangop dim in the background—the whole forming a vision of such perfect loveliness as defies description.

A PERFECT  
PANORAMA.

Here is the breeding place of countless wildfowl, —two varieties of geese, fifteen or twenty kinds of duck, and snipe, coot, tern, flamingoe, crane, divers, and waders innumerable. Scarlet and blue kingfishers, fiery coloured sunbirds, and flocks of widdah and other finks, red legged plover, spindle, shanked sandpipers, etc., etc., keep the air quivering with life and song. Hippos breed largely and otters are also plentiful. Although the water is excellent for drinking purposes, fish are absent, with the exception of a small kind of minnow. Possibly due to this fact, crocodile are unknown, and bathing therefore can be indulged in, without fear of this curse of African waters.

SPORT.

No shooting is permitted on the lake, or within one mile of its shores, from 1st May to 14th October inclusive.

CLOSE SEASON  
FOR  
SHOOTING.

The lake is an ideal place for motor boats and lovers of yachting; numerous islets forming attractive camping spots for picnics.

As a pleasure resort and sanatorium, the lake is of great value to the surrounding district, but its business value is equally great. Its waters form the hub of a giant wheel, whose spokes are represented by the boundaries of numerous farms fronting the lake shore. The railway runs for some miles within a few hundred yards of Lake Naivasha, and the possibilities of water borne transport are too obvious to call for further comment. Although the shore

is, in most places, shallow for some distance, there are numerous points where good deep anchorage can be obtained alongside cliffs, promontories, and natural banks.

**CHARACTER  
OF THE  
COUNTRY.**

Lying in that part of the great Rift Valley, which is bounded on the North by the Aberdare Mountains, on the South by the Mau Escarpment, the country in between consists, for the most part, of level grassy plains, plentifully dotted with shade trees. The grass is short and sweet, and the general effect is that of an enormous well kept park.

The foothills of the Mau Escarpment reach close to the Southern side of the lake, and on the West the slopes of Eburru end at the waters edge. On the East, the jagged peaks of Longonot, distant some 10 miles, are sharply defined, and the combination of mountain and plain gives a variety of grazing and soil, climate and temperature, to suit all tastes.

**WATER.  
RAINFALL.**

The Gilgil and Morendat Rivers, which rise in the Aberdare Mountains, empty into the lake on the North, but although there are indications of underground exits, no rivers flow above ground away from Naivasha. A small crater lake close to the southern shore rises and falls in sympathy with Naivasha lake level, and strengthens the theory of an underground exit. Boring operations have been successful, finding good water at lake level, while wells are numerous and springs fairly plentiful. Windmills are popular for farming purposes.

The rainfall varies with the altitude, ranging from roughly 30 inches to 45 inches per annum.

**SOIL.  
TIMBER.**

Close to the lake, there is a belt of rich dark soil which has proven unsurpassed for lucerne, mealies, and agriculture generally. On the hill slopes, dark and light chocolate loams are found, but the plain country is for the most part of a light sandy nature, unrivalled for stock, but less suited to agriculture.

On the plains, timber is mostly confined to small shade trees; mimosa and a species of *Ritchiea* (closely allied to the Caper) predominating. But on the mountain slopes, dense forest occurs, providing

ample supplies of heavy timber, such as cedar, podocarpus, olive, etc.

The Masai, Nandi, and Lumbwa tribes furnish herds, and attendants for stock farmers, while agricultural labourers are obtained from the Wakavirondo, Wakikuyu and Wameru natives. LABOUR.

Grade and Native Cattle have proven highly successful and in the former both milch and beef stock are well represented. The milk is rich in quality and the yield plentiful, so that dairying is highly remunerative. Sheep are commanding attention, and the percentage of lambing and prices realized for wool have been highly satisfactory. Horses, mules, donkeys, goats, fowls, turkeys, geese, ducks, etc., are greatly in favour, and there should be a big future for all of these. LIVESTOCK.

Grazing is particularly rich, and the feed varied, consequently a large amount of stock can be carried to the acre. The success of lucerne on the Lake shore increases the possibilities enormously, and what comprises amongst the best natural grazing in East Africa, gains from lucerne and proximity to the railway a special value, which cannot be found in many places elsewhere. GRAZING.

In addition to mealies and lucerne,—beans, and various cereals have succeeded, and mangel wurzels have yielded heavy crops at about 6,500 ft. altitude. But broadly speaking, Naivasha District is principally devoted to stock farming at present. STAPLE PRODUCTS.

Adjacent to the district the forest country of the Aberdares and the Mau provides a variety of big game, such as Elephant, Rhino, Buffalo, Lion, Leopard, Bongo, etc., but these are some few days away, and with the exception of lion and leopard, are seldom if ever seen in the vicinity of farms. In earlier days, ravages by the larger carnivora among stock were frequent, but closer settlement, sportsmen, traps and poison, have thinned out the lions and leopards, until the appearance of either is a "seven days wonder" in local circles. On the plains game is confined to various antelope, such as hartebeeste, waterbuck, Grants gazelle, Thompson's gazelle, bush and reed buck, klipspringer and dik dik (on the foot- GAME.

hills) and a few herds of zebra. In addition to the birdlife already mentioned elsewhere, two varieties of partridge, three francolin, guinea fowl, quail, and several kinds of pigeon are common. Warthog, hare, cerval, and cheetah may also be included in the list.

TRANSPORT.

The sandy and level nature of the plains result in roads of good natural quality, rendering transport by wagons, motor cars and motor cycles an easy matter.

CLIMATE AND HEALTH.

The air is dry and bracing—keen in the morning and evening, sunny and bright for the most part of the year, between the hours of 10 a.m. and 5 p.m. Fires are common at night, and warm clothing necessary. Naivasha may justly claim to be the Sanatorium of East Africa, for all who can stand an altitude of 6,000 feet upwards. Children thrive, and business men find a panacea for jaded nerves in this truly bracing climate. Mosquitoes are common on the edge of the lake, but rare a few hundred yards inland, while the fever mosquito (*anopheles*) is unknown so far as my information goes.

VEGETABLES AND FRUITS.

These naturally vary according to altitude, but all ordinary vegetables do well, and lettuce, cabbage, cauliflower, broad and other beans, potatoes, rhubarb, etc., are common. With regard to fruit, the same remarks apply, but the altitude renders the success of more tropical fruits such as citrus, pineapples, paw-paws, grenadillas, etc., doubtful. Pears, apples, peaches, and plums, strawberries, mulberries, figs, etc., thrive in various localities.

SPECIAL FEATURES.

The Government Farm, situate some five miles from the township, gives a practical demonstration of the success which attends stock farming, and is of unique value to the newcomer, who is enabled to acquire information based upon experience covering a large number of years.

Equi-distant between the two principal Big Game Areas of East Africa, Naivasha enables residents to indulge in shooting trips at comparatively low cost, and on the Aberdare Mountains, some twenty miles from the township, the streams are well stocked with trout. These readily take a fly, and fish up to nine pounds weight have been recorded.

LESLIE J. TARLTON.

## NYERI.

**T**HE district of Nyeri is situate between Mount Kenia and the Aberdare Range at an altitude of about 6,000 feet, and is distant about 100 miles from Nairobi. A good road through Fort Hall and Thika connects it with the Capital. The Nairobi-Thika railway accounts for 30 miles of the distance, and it is the intention at some future date to continue this line to Nyeri: in fact the work had already been started when war broke out, but had to be suspended.

SITUATION.

It is chiefly undulating country, of soil a deep chocolate colour very rich in humus, with a deep rich subsoil, similar to that of Kyambu. The district is exceptionally well watered, principally by the Chania, Muringatto, and other tributaries of the Tana and by the Tana river itself. These rivers are capable of supplying more than sufficient power for all the likely requirements of the district, and are already being made use of in this way.

SOIL AND RIVERS.

The climate is healthy and bracing: malaria does not appear to be present in the locality. The natural beauty of the district is exceptional, even for a country like British East Africa. Timber is scattered in patches, and parts of the great Kenia Forest are near enough to permit of their utilisation by the settlers in the district. There are two saw-mills, which turn out excellent building materials.

CLIMATE.

Development of various agricultural industries has been continuous for several years past. There are nearly one thousand acres under coffee, which is doing excellently, while sugar cane is grown along the rivers by both settlers and the natives. Beans and maize do well, and flax has been proved to do so. The farm of the Italian Mission grows wheat successfully, and most fruits—especially citrus—do well.

AGRICULTURAL DEVELOPMENT.

The district being situate in the midst of an immense native reserve, labour is plentiful and cheap. Men receive Rs. 4/- per month and women Rs. 3/-.

LABOUR

The country further out toward West Kenia is pre-eminently suited to cattle and sheep, the grazing being exceptionally good. Sheep do better there than perhaps anywhere else in the Protectorate. South Kenia is an endemic East Coast fever area.

WEST KENIA.

M. D. LE POER TRENCH.

## NAIROBI EXPERIMENTAL FARM, KABETE.

**FOUNDATION.** THE Kabete Experimental Farm was selected in 1907 by a Board of practical settlers and agricultural officials in place of the original Experimental Farm adjoining Muthaiga, where the soil was mostly of an iron stone formation, variable in quality and depth, and not representative of the arable land in the Kyambu, Kikuyu, and Limuru districts lying to the north and west; neither was it representative of the large grazing area to the south and east. On the other hand the Kabete Farm, which is situated on the border of the Kikuyu Reserve, is representative of the surrounding farms, and is 1,250 acres in extent. The Railway line some six miles west of Nairobi forms its south western boundary, and the Katisura (a permanent stream) its north eastern boundary. It thus occupies a convenient site and is readily accessible by either road or rail.

### PURPOSES OF THE FARM.

The purposes of the farm are :—

(a) To ascertain what crops are most suited to surrounding localities.

(b) To demonstrate the cultivation and manuring of crops, fruit trees, etc.

(c) To ascertain what stock do best: to establish pure breeds of cattle and pigs for the use and benefit of settlers, and so help forward the development of agriculture.

### WATER SUPPLY.

The farm is well watered. Besides the boundary stream, another small stream runs through the centre, which is fed by several springs. The main spring has a capacity of 40,000 gallons per 24 hours of pure water, very suitable for livestock and household purposes, and varies little in its flow throughout the year. The boundary stream has been tapped about two miles further up, and by means of a furrow water is conveyed to the farm for irrigation and other purposes.

### HOMESTEAD.

A large stone building has been erected and forms the centre piece of a proposed extensive steading, the building of which will be proceeded with according to plan when funds are available. Stone piggeries are already provided, but the cattle sheds and stock yards are, so far, temporary erections. Houses for

the staff have been erected, and a further stone building is now being commenced for the Station Assistant.

Five hexagonal huts of stone and iron, with the necessary conveniences, are provided for the use of pupils or young would-be-settlers from home or elsewhere, who are able to spend a few months or more at the farm, acquiring local knowledge before taking up farming on their own. Enquiries from military men and others are being received as to the conditions under which a course of training in agriculture can be undertaken, and it is anticipated that at the close of hostilities, the hostel huts will again be in request.

This institution consists of three large stone buildings capable of housing about a hundred inmates, and the warders. Suitable outhouse accommodation is also provided. During the past year the juvenile offenders averaged 70 monthly. The youths are regularly employed in the lighter operations of the farm such as milking, care of pigs and other live stock, budding of citrus and other trees, cultivation and curing of tobacco, pruning of coffee trees and curing of the berries, treatment of flax, rearing of silk worms, etc., etc. Elementary instruction in school is also afforded the inmates. On completion of his term of detention a certificate is given each youth stating the special branch of agricultural or horticulture in which he has become efficient.

This is situated on the higher farm lands adjoining the railway, where there is a siding at Mile 333. For its size the Laboratory is said to be one of the best equipped in all Africa.

The position of this is between the main nursery and fruit section. Here, and in the fields, are studied and worked out the life histories of pests, etc., and control measures devised for dealing with the same. A fairly extensive collection of entomological specimens has been got together and is constantly being added to. Experiments in the rearing of Eri and other silk worms, are being conducted.

The cultivations are on two sections of the farm, one on the south side of the road near the entrance to the farm from the Kirawa end, and the other on

the higher land in the direction of the Pathological Laboratory. In the first field there are 5472 bearing trees mostly planted in November, 1911, the vacancies being filled up the following spring. In the second field the bearing trees number 8564, nearly all of which were established in 1912. The crop of cured parchment coffee from both fields amounted, during the past year, to 19,620 lbs.—an average yield per tree of about 1lb. 6 ozs., the bulk of which was disposed of at Nairobi at 27 cents per pound. Coffee leaf disease was present in places, but the control measures adopted prevented any serious harm being done.

COFFEE  
CURING  
MACHINERY.

The pulping of the whole of the 1916-17 crop was done with a small Jamaica pulper, located in the main nursery grounds, where the curing was also carried out. As the coming year's crop is estimated at 12 to 15 tons of cured parchment coffee, proper facilities for dealing therewith have been provided adjoining the spring. A Gordon "A." pulper has been installed, and the necessary fermenting and washing tanks, etc. The utilization of the new site necessitated the draining of a small swamp which was filled in with stones and other suitable material at hand. An upper terrace where the coffee beans will be cured has been laid out, the whole work necessitating the removal of about 640 cubic yards of material. Houses for storing the coffee have been erected.

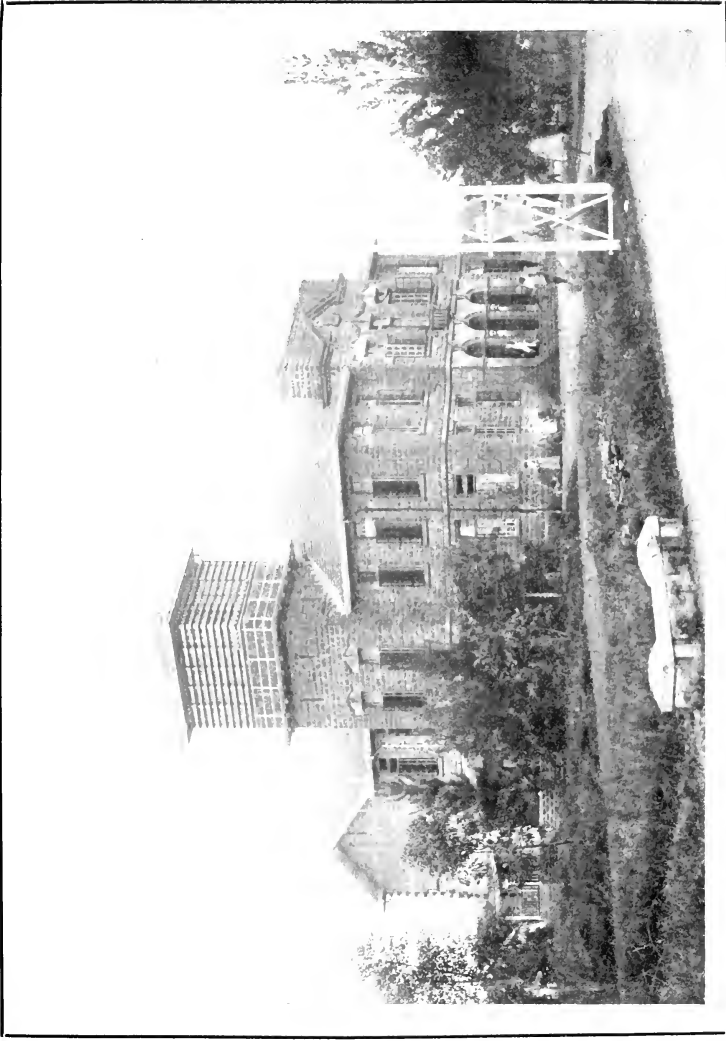
FLAX.

Flax thrives well at Kabete. A retting tank, small hand breaker and a treadle scutching machine are in use on the farm. The demonstrations initiated by the late Mr. R. Dedonkele in the treatment of flax are being continued by his successor. During the past year several settlers interested in flax growing indentured a number of their boys for a few months to receive training in the treatment of the plant.

CITRUS

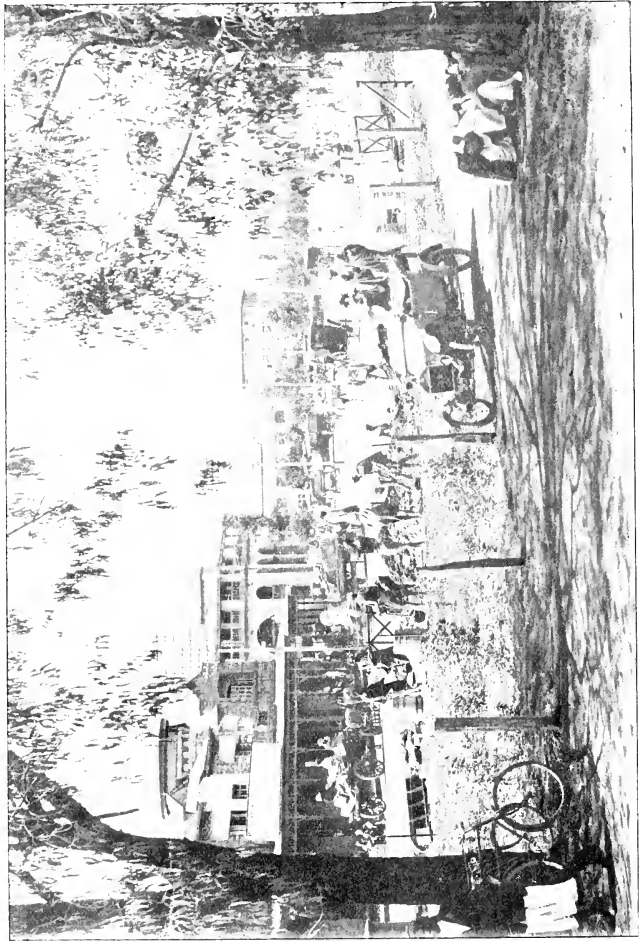
Much useful work is being done by the Citrus Expert in the direction of the establishment of a citrus industry in the Protectorate. 3660 budded plants of assorted oranges, lemons, Tahiti lime, and grape fruit, were sent out during 1916-17. A considerably larger number of budded plants are in the nurseries, and will be ready for disposal during next





*Photo by H. K. Dinks.*

**GENERAL POST OFFICE, NAIROBI.**



*Photo by W. D. Young.*

**SIXTH AVENUE, NAIROBI.**

short rains. In the previous year the number of budded citrus plants disposed of, which included oranges, limes, naatjes, lemons, and grape fruit, totalled 4,938. Rough lemon stocks amount to 9,700.

The citrus trees at Kabete carry heavy crops of fruit. Lemons, limes and grape fruit are very satisfactory. The oranges and naatjes are of fine size, but somewhat lacking in flavour. This may be due to stock influence, or to cross pollination by the lemons planted close by.

Exhaustive trials with various varieties of TOBACCO. tobacco have been carried out over a series of years at Kabete. While growth has been excellent the quality of the tobacco has not been all that was desired, as is shown by the following report from the Advisor for Tobacco:—

“Samples of six varieties of tobacco grown at Kabete were sent home for report. These samples included both air cured and sun cured leaf. The report shows that these types of leaf are not acceptable in the home market at highly remunerative prices. The type of leaf desired is a bright flue cured leaf, for which the Kabete soil is not suitable.”

During 1916, 4,050 lbs. of cured tobacco leaf, and 200 lbs. of manufactured snuff, were disposed of to the Military at cost price. A further large quantity of cured tobacco leaf has been similarly disposed of in the current year.

The varieties under trial are:—Natal Uba, West SUGAR CANE. Indian Sealey Seedling, West Indian B.1528, West Indian B.3922, West Indian B.2396. Uba is particularly serviceable in the form of chopped green feed, mixed with mealie meal and other crushed grain, for the dairy cows. Of the West Indian varieties Sealey Seedling is, so far, the most promising. Large numbers of cuttings of the canes have been sent out to settlers in various parts of the Uplands.

These are highly satisfactory, especially potatoes, VEGETABLES. beans, peas, brocoli, cauliflower, turnips, carrots, AND SALADS. cabbages, lettuce, radish and tomato. Pot herbs in variety are all that can be desired.

GINGER.

Among the newly imported economic plants under trial at Kabete, is a plot of ginger, raised from rhizomes received in Nov., 1916, from the Cedara School of Agriculture, Natal. The plants have made good growth and their general condition is encouraging.

URENA  
LOBATA.

The fibre from the inner bark of this shrubby plant of the Malvaceae order, is being used in Brazil for the manufacture of coffee sacks, etc. Part of a small consignment of Urena Lobata seed obtained from the Department of Agriculture, Ceylon, and sown at Kabete in the middle of January, 1917, has germinated satisfactorily, but the seedlings are making slow growth.

TEA.

Several nursery beds were planted with Tea seed, imported from India, at the end of March, 1917. 50% of the seed germinated, and at the time of writing the seedlings are healthy and thriving. In previous reports of the Economic Plants Division mention has been made of the Tea bushes at Cameville, Limuru, where growth has been excellent. Similar results are reported in connection with the Tea bushes established at the Government Administrative Station at Kericho.

TELFARIA  
PEDATA.

This is the name of the huge cucurbitaceous plants rambling over several Albizzia trees in a section of the main nursery. It belongs to the cucumber and melon family and is a native of the Shimba Hills and Taveta districts, as well as other parts of the lower tropical belt of the Protectorate. The fruit is frequently 18 inches to two feet in length, and 8 to 10 inches thick, with several deep longitudinal furrows outside. Numerous circular seeds are produced, from an inch to an inch and a half in diameter. They yield by pressure an excellent bland oil, and besides, are eaten as dessert, the flavour of the nuts much resembling that of the Brazil nut and the Caryocar nut.

From a spectacular point of view the clump of Telfairias at Kabete holds premier place with visitors, hence the following brief historical notice may be recorded. In 1904 Kweme seeds were collected in the Taveta district by Mr. Andrew Linton, and from these seeds several plants were raised the same year by the compiler of these notes, and established at the old Experimental Farm, where they subsequently

fruited, The Kabete plants under notice were raised and established by Mr. G. W. Evans in 1909 from seed obtained by him at the old Experimental Farm referred to.

The outstanding feature in connection with the farm during 1916-17 has been the supplying of milk to sick and wounded soldiers and to the Carrier Corps at the Military Hospitals and bases at and around Nairobi. In all 30,985 gallons were supplied. The Military authorities very considerably helped in the matter by placing at the disposal of the farm sufficient native cows to augment the milk from the Department's pedigree and grade cows. Foodstuffs and other material, and a proportion of the herd boys, were also supplied by the Military.

The following tables dealing with the field crops at Kabete are taken from the Annual Report for 1915-1916.

### MAIZE VARIETY EXPERIMENTS.

FIRST SEASON:—AREA 23·02 ACRES.

Variety.	Planted.	Duration	Har-vested.	Yield. per acre.
Hickory Horse Tooth	1915 29th—36th Mar.	About 6 mths	1915. Aug. 8th	1,393 lbs.
do. ...	do	do.	.. 9th	2,596 lbs.
Ladysmith White ...	27th—29th Mar	do.	Sep 29th	3,439 lbs.
do. ...	2nd April.	do.	Oct. 4th	1,478 lbs.

An area of 8.48 acres was planted on 29th—30th March, 1915 and harvested on the 8th August, 1915. Half of this area had lain fallow during the previous season and half had carried a crop of beans. The yield from the portion after fallow was 1,393 lbs. per acre, and the portion after beans gave a yield of 2,596 lbs. per acre. The whole plot received the same treatment as regards planting, harvesting and general cultivation. The superior growth of the bean portion of the area was most marked almost from germination and the result is worthy of the attention of settlers.

## BEANS.

### BEAN VARIETY EXPERIMENT.

FIRST SEASON :—AREA 58 ACRES.

Variety.	Planted.	Duration	Har-vested,	Yield per acre
	1915.	About	1915	
Rose Cocos ...	5th May.	4 mths	30th Aug	709 lbs.
Canadian Wonder ...	7th May	do.	6th Aug	812 lbs.
Noyau au Blanc ...	30th April.	do	13th Aug	628 lbs
Braila Flat White...	20th May.	do	16th Sep.	302 lbs.

SECOND SEASON :—43 48 ACRES.

Variety.	Planted.	Duration	Har-vested	Yield per acre.
	1915.	About	1915.	
Canadian Wonder ...	11th Nov.	4 mths.	11th Feb.	374 lbs.
Noyau au Blanc ...	6th Nov.	do.	9th Feb.	383 lbs.
Braila Flat white...	17th Nov.	do.	4th Mar	359 lbs.
	12th Nov	do.	15th Feb	459 lbs.

During the first season we had good rains and in the second rain only fell when the crop was planted and none during their growth.

BEANS, ETC.—(SMALL PLOTS).

FIRST SEASON.

Variety.	Planted	Harvested	Yield per acre.
	1915	1915	
Canadian Wonder Beans.	17th April	17th Aug	1,480 lbs.
Field Peas ...	14th ..	28th ..	1,080 lbs.
Rose Coco (Selected) ...	19th ..	17th ..	1,400 lbs.
Flagelot Beans ...	17th ..	14th ..	1,810 lbs.
Lentils (Egyptian) ...	17th ..	26th ..	1,225 lbs.
Broad Beans ...	17th ..	28th ..	652 lbs.
Butter Beans ...	19th ..	10th ..	990 lbs.
Telephone peas ...	17th ..	28th ..	900 lbs.
Noyau au Blanc ...	19th ..	7th ..	960 lbs.
Rose Coco ...	19th ..	17th ..	1,255 lbs.
Stratagem Peas ...	19th ..	28th ..	1,340 lbs.
White Coco Beans ...	19th ..	28th ..	1,230 lbs.
Schmaltzbahnen ...	17th ..	7th ..	940 lbs.
Horse Beans ...	16th ..	3rd Sep.	875 lbs.
American Wonder Peas.	16th ..	3rd ..	742lbs..
Indian Gram ...	17th ..	Failure	

SECOND SEASON.

Variety.	Planted.	Harvested.	Yield per acre.
	1915	1916.	
Broad beans	... 2nd Nov.	8th April.	1,069 lbs.
Schmaltzbahnen	... ..	18th Feb.	540 lbs.
Canadian Wonder	... ..	..	450 lbs.
White Coco	... ..	..	720 lbs.
Lentils—Egyptian	... ..	..	950 lbs.
Rose Coco (Selected)	... 3rd Nov.	20th Feb.	490 lbs.
Butter beans	... 2nd Nov.	3rd Feb.	375 lbs.
Noyau au Blanc	... ..	..	720 lbs.
Flagelet	... ..	18th Feb.	810 lbs.
Indian Gram	... 3rd Nov.	Failure	
Telephone Peas	... ..	22nd Feb.	1,125 lbs.
Horse beans	... 2nd Nov.	Failure	
Soya beans 88	... ..	10th Mar.	180 lbs.
" " mammoth	... ..	10th Mar.	198 lbs.
Cow pea—New era	... ..	Not yet harvested	
" Giant	... ..	..	
" Brabham 103	... ..	..	

The Soya beans and cow peas have been grown from seed which the Department of Agriculture, Washington, D. C. kindly sent us. This is the first time we have been successful in getting any yield from Soya beans on this farm. The Cow peas germinated well and we hope to obtain a supply of seed from these which will enable us to plant out a large area very soon. Beans ought to be an exceedingly valuable crop under present circumstances, but the difficulty of harvesting them unless where labour is plentiful will probably prevent their being grown on any large scale.

BEANS AND PEAS.

The return given below shows at a glance the large number of live stock now on the farm.

LIVE STOCK.

Cattle are thriving splendidly : pigs are also very satisfactory. Poultry do well. The few sheep on the farm are thriving.

Ayrshire Cattle (Bulls, cows and calves)	...	17
Red Polls (Bulls, cows and calves)	...	3
South Devon Cow	...	1

Red Polls South Devon Cross	...	...	3
Native Cattle	...	...	42
Grade Cattle	...	...	152
Work Oxen	...	...	78
Grade Sheep (Rams, ewes and lambs)	...	...	48
Native Sheep	...	...	10
Horses and Mules	...	...	5
Elands	...	...	3
Pigs. Berkshire, Tamworth, Long Black and Cross Bred	...	...	85

H. POWELL,  
*Acting Manager.*

## **THE GOVERNMENT EXPERIMENTAL FARM, KIBOS.**

### FOUNDATION.

Although the agricultural possibilities of the Kavirondo country have always engaged the close attention of the local administration, it was not until the year 1905, when the Kibos Farm was established, that any definite steps were taken to inquire into and systematically develop the agricultural resources of the Kavirondo or Nyanza Province.

### POLICY OF THE FARM.

It was soon recognised that if such an institution as the above were to produce lasting benefits to both the European agricultural community and the native peasants and Indian cultivators of the Province, the improvement of existing agricultural industries and the introduction of new ones, should be made the basis of operations.

Accordingly improved varieties of seed of the more important of the exportable crops grown in the Province, such as beans, cotton, maize, groundnuts and sim-sim, were specially imported and distributed free for cultivation.

In the meantime experiments were conducted on the Farm with these and other crops, with a view to



finding out methods of treating them calculated to produce higher yields than those obtained under the methods of cultivation in vogue.

In this way the Farm served the dual educational purpose of furnishing valuable information to the European settler in the neighbouring districts as to the kind of crops suitable for growing under conditions similar to those existing at Kibos, and providing instruction to the natives in more improved methods of dealing with their crops. Further, the Farm has itself proved a source of much usefulness by demonstrating to the numerous Indian shamba owners of the district the benefits to be derived from, and the desirability of employing, up-to-date methods of treating the soil by the use of modern agricultural implements. And it is gratifying to note that as a result of this demonstration the primitive Indian pole plough has practically disappeared from the district, the vast majority of the Indian cultivators now being owners of good ploughs, harrows, etc.

The importance of thoroughly preparing the soil before planting is also being rapidly appreciated by the various native chiefs of the Province, several of whom have lately invested in English ploughs, and the training of oxen for the use of these has become part of the regular routine of the native farm.

Recently, at the instance of the Provincial Commissioner, Colonel John Ainsworth, C.M.G., a further effort was made to bring the educational influences of the Farm to bear more directly on the youths of the Province by the establishment of an Agricultural School.

As has already been mentioned, the nature of the work conducted on the Farm necessitated a number and diversity of crops being dealt with. Several of these have been thrown out of cultivation, either because the conditions existing at Kibos, were found to be absolutely unsuitable to them, or because the trials with them had furnished the special information sought after. Of the more important crops that have received attention mention might be made of the following :—

#### BEANS.

These include the White Haricot, Rose Cocos and

Canadian Wonder varieties. Whilst each gave fairly satisfactory results, the Canadian Wonder proved the most prolific, with yields ranging from 900 to 1,000 pounds per acre. There are large stretches of country in the Maragoli, Bunoyri and adjacent districts specially suited to the growing of this crop. The planting season at Kibos is August to September: duration of crop, 12 weeks.

#### COFFEE.

Although the flat lands at Kibos are not considered ideal for coffee growing, the trials so far carried out have on the whole produced fairly satisfactory results. Under the conditions existing at the Farm the plant has a tendency to become bushy. The beans, too, are smaller than those produced in the neighbouring districts of Songhor and Koru, and though the trees bear heavily the percentage of light beans is higher. Further up toward the Nandi Hills, however, the conditions are more favourable, and with due attention paid to such matters as pruning, draining and spraying, coffee growing should be a profitable commercial proposition.

#### RICE. UPLANDS AND SWAMP VARIETIES.

Trials conducted at the Farm with the Upland variety of rice, as well as with the Swamp varieties in suitable parts of the Province, have given most encouraging results. As a native crop the prospects of rice largely depend upon the natives learning to appreciate it as food, whilst as a European crop there are enormous possibilities for Swamp varieties awaiting realisation by the development of the very large swamps in the district, as well as in other parts of the Province. The yields obtained with these crops are:—Swamp Rice grown by natives, 1,050 pounds; Upland Rice grown on the Farm, 1,200 pounds per acre. Duration of crop, six months.

#### UPLANDS COTTON.

This crop has been grown with great success on the Black Cotton soils of the Farm. Although the average yield for the past five years may be considered fair—700 lbs. of seed cotton per acre; the duration of the crop—9 months—and the low price offered locally for the seed cotton—6 to 9 cents per lb.—have been advanced as arguments against its suitability for European cultivation. The foundation of a fairly substantial Native cotton industry has already been laid down in the Province.

Trials were started on the Farm with several MAIZE. varieties of pure bred maize, viz., Hickory King, Yellow Hogan, and Chester County Mammouth, but in keeping with the efforts of Government to substitute improved white varieties for the inferior kinds grown by the natives, the experiments have latterly been restricted to Hickory King only, this variety having proved itself the most popular for both local and export purposes. This year, for the first time, a large area has been put under Hickory King by the natives in their reserves, and it is hoped within a few years to entirely replace native maize with this variety. In normal years the average yield of maize in Kibos is 1,800 pounds. Planting season, March to May.

There are perhaps few other undertakings that TROPICAL FRUITS. hold greater promise for the planter in the Kavirondo country than tropical fruit growing, which has always been a feature of the work on the Farm. Good tropical indigenous fruits are conspicuous by their absence, and the work of introducing these has engaged close attention. Of those that are now thoroughly established on the Farm mention might be made of the following:—Oranges (imported), Mangoes, Guavas, Limes, Custard Apple, Pomegranate, Pawpaws, etc.

Just as fruit growing with some suitable catch SUGAR CANE. crop, offers a good opening for the man with small capital, so is sugar cane in the Kavirondo country the crop for the man or syndicate with large capital. In view of this, trials have been started with three or four seedling varieties imported from the British West Indies and the Uba Cane from Natal.

With the exception of the trees known locally as TIMBER. "Siala," which occurs in certain restricted areas, there is a striking dearth of good timber suitable for building poles in the Province. Recognising this, demonstration plots have been established on the Farm, and free issues of seeds are made to the natives with a view to encouraging them to undertake the afforestation of their districts and the establishment of shady avenues along the main roads therein. The varieties of trees employed for this purpose are:—*Eucalyptus citriodora*, *Grevelea robusta*, *Cassia florida*, *Pithecolobium saman*, and Black Wattle.

## TOBACCO

Trials carried out with several varieties of tobacco on the Farm have shewn that good sized leaves can be grown, though the texture of them is inclined to be somewhat coarse. Close planting, however, was resorted to in the endeavour to rectify this, with very encouraging results. Attempts made at curing and preparing the leaf met with fairly satisfactory results and produced a type of tobacco especially suited to the taste of strong tobacco smokers. The yield of cured leaf per acre was 475 lbs. The varieties that have given the best results are White Burley, Gold Finder and Raglan Conqueror.

H. H. HOLDER.

## NAIVASHA GOVERNMENT STOCK FARM.

### FOUNDATION.

**T**HE Farm was started in a modest way in November, 1903, and as there were then, and for some years after, few settlers in the country, the progress made at first was slow, but steadily increased with the influx of new settlers. Additions were made to the stocks of purchased cattle and sheep, and the trials made with these and in crossing with the native breeds were of material assistance to the early settlers, and have had considerable influence in developing the stock industry of the Highlands.

### IMPORTED CATTLE.

At the present time we have on the Farm pure-bred Shorthorn, Ayreshire, Hereford, Friesland and Guernsey cattle, many of which were born on the place, and have crossed bulls of these breeds with native cows with very good results, and have now up to fourth and fifth crosses. The Shorthorn has been and is a very popular breed, and one that I think the East African stockbreeder should make every effort to develop, both for milk and beef. The Friesland does exceedingly well, develops satisfactorily, is a good milker, and the breed is very popular with many of the settlers. As far as I can judge there is no question as to its continuing to prove a suitable breed for the country. The Ayreshire has also done very well, and proved commercially successful all through, although not as big as

the milking Shorthorn. For this reason some breeders consider that they do not make as fine bullocks as other breeds, but they are good milkers and good doers, and this goes a long way in a new country. The Herefords on the Farm have not been the success that was anticipated, due in my opinion to the effects of tick diseases. Although hardy cattle and able to withstand drought, they appear lacking in powers of resistance to disease. It is quite possible that they will do better in future with dipping—in fact I am of the opinion that they will. The purebred Guernsey cattle that were imported did well, and a cross between a purebred Guernsey cow and a Coats Herdbook Bull have done exceedingly well, and are very fine cattle to look at, besides being good milkers.

It should not be forgotten that a cross between the Polled Angus and a Shorthorn cow makes a butcher's animal that cannot be surpassed. And a Shorthorn crossed on to an Ayreshire cow makes a very useful animal, a Shorthorn being used on each cross afterwards. I saw herds of cattle in Australia where this had been done in the early days, and these cattle are now among the leading milking herds of Australia.

The grade cattle—that is the cross with native cows and purebred bulls—have been in my opinion a success, and we have on the farm up to fourth and fifth crosses in some of these breeds. At the present time I think that the grade Shorthorn stands out well, and also the cross where a Guernsey bull was used on a native cow and then a Shorthorn bull on each cross afterwards. These cattle were examined by some leading settlers a few weeks ago, and were commented on as a very fine lot.

The grade Ayreshire cattle bred in the same way as the grade Shorthorn with the native animal are very nice beasts, true to type and exceedingly good milkers.

The grade Herefords have done ever so much better than the purebred, and I think with care should be a success, as they are now doing much better on the Farm, and from a butcher's point of view some of them are splendid animals to look at. As might be expected, they are not good milkers.

GRADE  
FRIESLANDS

The grade Frieslands are doing well and milk well, and can be considered a success by people who like Friesland cattle.

SUITABILITY  
OF THE HIGH-  
LANDS FOR  
DAIRYING  
AND STOCK  
RAISING.

As already stated, I consider that the cattle have done very well, more especially the milking breeds, and it is quite likely that the greater part of the Highlands will be found more suitable for dairying and agriculture than for ranching beef cattle, though there are parts of the Protectorate suitable for running big herds of beef breeds. The numbers of the different purebred and grade cattle on the Farm at present are:—

Purebred Shorthorn	...	...	62
„ Ayreshire	...	...	84
„ Friesland	...	...	87
„ Hereford	...	...	12
Pure Guernsey and Shorthorn Cross.			10
Cape Imported Cattle	...	...	13
Grades bred as above	...	...	101
Working Oxen	...	...	21
			396

This figure includes calves. There are no native cattle on the Farm, and no grade below three-quarter bred or second cross.

SHEEP

The purebred sheep at present on the Farm include Merino, Suffolk and Lincoln, all of which have been crossed with the native sheep up to the sixth and seventh crosses. The Kerry and Welsh breeds were also stocked at one time.

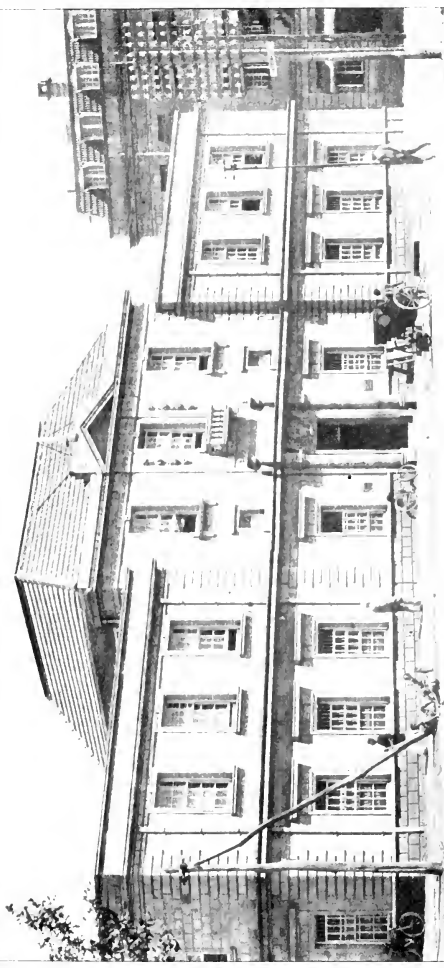
MERINO.

The Merino sheep imported from Australia and bred in the country have been a success in the way of paying for wool, wethers and increase. The wool has been very well reported on by London brokers. The Merino flock has averaged as much as eleven pounds of wool; stud rams have given from 28 to 36 lbs., and stud ewes 20 lbs. or more.

The Suffolk and Lincoln are at present used for a cross on the native sheep or on to the native cross Merino ewes.

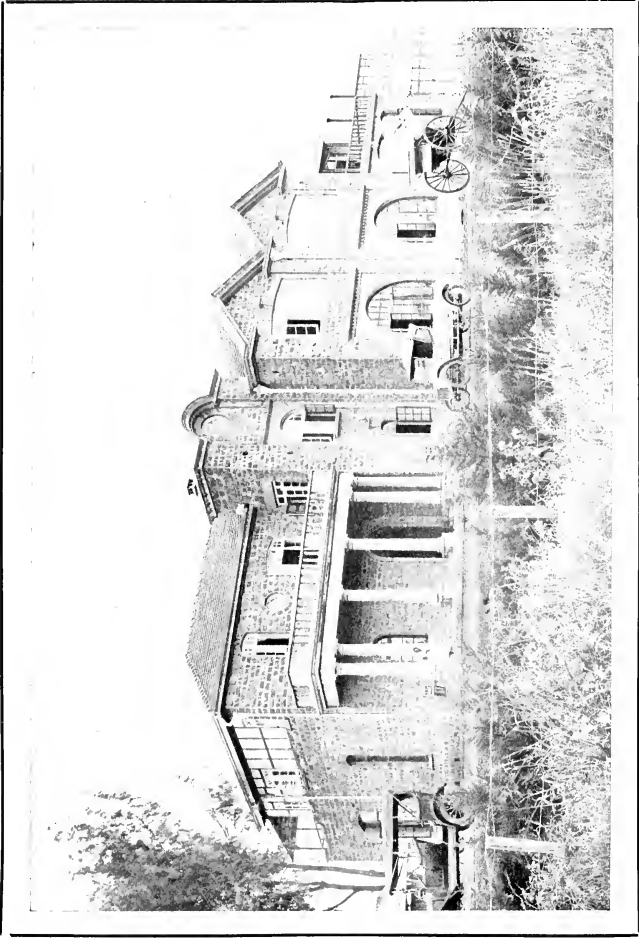
MERINO  
GRADES.

The Merino grade sheep is a very paying animal from the second cross onwards, and the third and



*Photo by W. D. Young.*

**STANDARD BANK OF SOUTH AFRICA, LTD. NAIROBI.**



*Photo by Sandeman.*

**NAIROBI CLUB.**



fourth crosses give a marvellous return in wool—so much so that with high cutting and careful sorting of the wool we get the same price in London as for the pure Merino. These are of course picked fleeces, but, on the other hand, no flock ever became great without heavy cutting and selection, a fact which should be kept in mind by all settlers in a new country.

The cross obtained from using the Lincoln ram with the native ewe in the first instance, and then Merino on each cross afterwards, has been very successful. The wool from the 3rd and 4th cross of this grade was very well reported on in Australia and much liked by sheep farmers there. It is now my intention to put Lincoln rams back on to the 3rd and 4th cross Native/Lincoln/Merino ewes, as I feel sure that the result will be good as regards both size and the paying quality of wool. Another consideration is that the Lincoln or Romney Marsh throws no dark colour with the Merino wool, while at the same time it gives the Merino size.

The Suffolk purebred rams have done well, and the cross on the native ewe is all that could be desired, and the rams of this cross are in great demand with many settlers. We have up to the fifth and sixth cross of this class on the Farm, and also one where we used the Suffolk on the native and then Merino on each cross afterwards. Though this gives very nice sheep in the higher grades, the wool is not anything like the same quality as that obtained with the Lincoln cross.

We also had crosses with Kerry Hill and native sheep, Welsh and native and Shropshire and native.

Taken as a whole, the sheep on the Farm are paying very well. The importations of purebred Merino have been from Haddon Rig, Wanganella and the famous Boonoke flock in Australia. The rams and ewes from the last mentioned flock have done exceptionally well.

The stallion on the Farm "Royal Fox," an Irish hunter, has given every satisfaction, and many of his progeny have been seen on the local race-course. He is at the service of settlers for the low

fee of Rs. 20 (£1/6/8) per mare served, so as to improve the class of animal in the country.

PIGS.

A few Long Black, Tamworth and Berkshire pigs are kept on the Farm, but the principal source of supply is the Kabete Farm.

GOATS.

Angora goats were imported from South Africa some years ago, and later we imported some from Australia, all of which have done well and given very good results in crosses with the native goat.

DONKEYS.

We imported two Catalonian jack donkeys—one of a trothy and one of a draught kind—which have been crossed with the native donkey with every success. Their progeny are in great demand among the settlers, as they are a great advance on the native donkey.

PROSPECTS  
OF THE  
HIGHLANDS  
AS A STOCK  
COUNTRY.

In considering the prospective development of the Highlands of East Africa as a stock country, people would do well to bear in mind that progress must be gradual. It is unreasonable to make comparisons with Europe or Australia, and to expect that every beast bred should be equal to those for which these countries are famous. Even with the greatest care in selection, severe culling is necessary to maintain the quality of herds in other stock centres, and we can only expect to attain the same high level of quality in the course of time by pursuing the same methods.

HOUSING  
AND FEEDING  
OF STOCK.

I have always held—and have proved so far as this Farm is concerned, that the housing of animals and heavy feeding is a mistake, except in the case of stud bulls. I find that all the purebred cattle that are left in the open and brought as little as possible to sheds do best. When I say left in the open I mean left to graze all day and to sleep at night in fenced in bomas of about five acres in extent, calves and all alike, without cover. I have found that housed and stall-fed bulls in show and sight seeing condition do not perform their work as well as the animal that is out all day and receives a little feed night and morning. No purebred cow is ever fed here by me except very old, or out of order with a young calf or through heavy milking. They all have to do for themselves, and

I find that the more they are kept in the open and away from sheds the less liable cows and calves are to disease. None of our purebred bulls get any feed other than their mother's milk and grazing until they are about twelve months old, and then only for a month or two before our annual sale, when they are fed on mealie meal, grass hay and a little lucerne and are allowed to graze out all day. Very often they have only had mealie meal and grass hay—lucerne not being available. This can hardly be termed pampering. It is such feed as any settler could afford to give a purebred bull—mealie meal and grass hay night and morning—and that most likely to give the best results.

Sheep and other animals on the Farm are similarly treated. Young purebred Merino rams get a little crushed maize night and morning for a couple of months before the annual sale, and the Merino ewes get crushed maize while the tugging season is on—which lasts for six weeks at a time.

TREATMENT  
OF SHEEP,  
ETC.

There can be no question of the part the Farm has played in bringing the stock industry of the Protectorate to its present stage, even after due allowance has been made for the enterprise of those settlers who have also imported stock. I hope that in the future the Farm will do even more good by increased importations of high quality stock, and by doing so enable the settler to obtain acclimatized animals cheaper than they could import. Although no animal is put up at the annual sale without reserve, bidding is generally very brisk and the prices paid are comparatively high. Proof of the desire of the Department to help forward the stock industry is the fact that the proceeds of the last sale have been devoted to the importation of more purebred bulls—a policy that I trust will be continued, as it will prove of great benefit to the country.

INFLUENCE  
OF THE  
FARM.

The Farm is roughly 4,500 acres in extent, and at present carries the following stock:—

SCHEDULE OF  
STOCK.

Cattle, as already enumerated	...	396
Sheep, both pure and grade	...	3,300
Pure Angora and Grade Angora Goats		320
Pure Catalonian Jackass	...	1

Half and Three-quarter bred Catalonian					
Donkeys	...	...	...	...	127
Native Donkey Mares	...	...	...	...	43
Ostriches	...	...	...	...	28
					4,215
				Total,	

These numbers include both young and old. As the Farm pays its way and is no cost on the Protectorate, it will be seen that the stock have done well, that they have not been pampered, and that the place has been run on common-sense lines.

N. A. MCGREGOR,  
General Manager.

## GAME IN RELATION TO FARMING.

GAME STILL  
ABUNDANT.

GAME has played an important part in the development of East Africa. Many attracted in the first instance by the prospects of sport, have remained to exploit the business possibilities of the country. As civilization has advanced, the game has, to a certain extent, retired, but it is still as abundant as ever away from settled areas, and many private land owners are jealously protecting the herds on their own land.

EFFECTS OF  
THE GAME  
REGULATIONS.

Government has wisely guarded against a repetition of the wanton slaughter which has destroyed the recreation of thousands in other parts of the world, by carefully considered Game Regulations. These, while liberal to the sportsman, are framed with a due regard to protection of the game, and if the present system is continued there appears to be no reason why East Africa should not permanently retain its Happy Hunting Grounds without interference with the farmer.

ARGUMENTS  
FOR AND  
AGAINST  
RETENTION.

Undoubtedly the prevalence of large quantities of game side by side with agricultural and stock farming entails certain risks, but it is urged by those in favour of retention of the game that corresponding advantages in turn outweigh the dis-



*Photo by W. D. Young.*

**ST. AUSTIN'S MISSION CHURCH, NAIROBI.**



*Photo by W. D. Young.*  
**A POLICEMAN, NAIROBI 1901.**

advantages. An attempt is made below to tabulate side by side the arguments for and against :—

AGAINST.

(1) Many of the worst stock diseases are tick borne: *e.g.*, East Coast Fever. Ticks attach themselves to the game and are carried amongst domestic animals.

(2) Eland, Buffalo, Kudu and Duiker are accused of carrying Rinderpest.

(3) Damage to fences.

FOR.

(1) The existence or absence of ticks has little or no relation to the quantity of game: *e.g.* the Uasin Gishu, the Illoita Plains, the Rift Valley and the N. Guaso Nyiro have larger herds of game than anywhere else in East Africa. Ticks in some of these areas are entirely, and in others almost entirely, absent.

(2) Not proven. Vultures are suspected of being the main culprits, as they travel long distances and after feeding on a Rinderpest-stricken animal their excrement may disseminate the germ of Rinderpest. It is pointed out that Rinderpest spreads more rapidly in South Africa over gameless country than it has ever done in East Africa.

(3) So far as grazing areas are concerned, the game speedily learns to respect fencing, although damage is caused to commence with. On Lord Delamere's Soysambu Estate there are many miles of fencing, with large herds of game on the one side and large herds of cattle on the other. The game does not attempt to interfere with the fencing.

DAMAGE TO  
CROPS.

(4) Damage to stand-  
ing crops.

(4) That, broadly speaking, the principal agricultural centres are situate in areas naturally devoid of game. That the remedy lies in the owner's own hands—the Game Regulations providing for wholesale destruction when the game is damaging crops.

CONSUMPTION  
OF GRAZING.

(5) Destruction of grass  
required for feed of  
domestic stock.

(5) That until the farm is sufficiently stocked with domestic animals the game keeps the grass short and sweet. That feed only becomes scarce when a district becomes greatly developed. In this case the game automatically retires in face of civilisation, and ceases to be a menace.

TSETSE FLY.

(6) Tsetse Fly feeds  
principally on game and  
the retention of game  
provides a breeding host  
for this dangerous insect.

(6) Emphatically disputed by the scientist. Numerous instances are cited in East Africa of the continuous existence of game and the complete absence of Tsetse Fly, and of the continuous presence of Tsetse Fly in the absence of game.

AN IMPORTANT  
CONSIDERA-  
TION.

It should be remembered that for centuries the natives have kept vast herds of cattle and sheep, and cultivated millions of acres, whilst the game has been allowed to roam and breed unchecked; and that it has been found in America that definite evils arise through upsetting the Balance of Nature.

ADVANTAGES  
OF RETEN-  
TION.

While the benefits to result from wholesale destruction are a matter of theory, certain definite advantages obtain today from protection:—

(1) Steady revenue to Government from licenses, railway freights, and customs dues.



(2) Steady assistance to importers, who provide clothing, food, camp equipment, arms and ammunition, to visitors.

FURTHER  
REASONS IN  
FAVOUR OF  
RETENTION.

(3) Steady advertisement of a country whose main need is capital and yet more capital to develop it.

(4) Steady recreation not only to the visitor but to the resident, and the breeding up of a virile type of colonial. "Waterloo was won on the play grounds of Eton", and the parents of East Africa's youth should think twice before they do away with the game—at any rate until they are quite sure they have something else to take its place in maintaining the virility of their sons.

In conclusion the writer would point out that he has had an opportunity of reading most of the articles which go to make up this book, and he considers it of great significance that none of the writers advocate wholesale slaughter of the game.

LESLIE J. TARLTON.

## A NUCLEUS OF CO-OPERATION.

### The B.E.A. Maize Growers' Association.

SUCCESS in co-operation, it has been said, results from starting simply and quietly, the members of an association gradually educating themselves in the spirit of working together and accustoming themselves collectively to facing difficulties that from time to time are bound to arise. The co-operative spirit is a thing of gradual growth, and under conditions such as usually obtain in a young country like British East Africa, the growth must be very gradual if success is to be the consummation. Until co-operative strength and confidence be established, the work of a co-operative organisation should be of the simplest possible nature.

ESSENTIALS  
OF SUCCESS.

Holding this view, the B.E.A. Maize Growers' Association has adopted as its guiding principle the old adage "creep before you crawl." The Association is at present simply a maize selling society, *i.e.*, its

WORK OF THE  
ASSOCIATION.

entire activities are devoted to the sale of present crops and to making provision for shipment of future supplies. It is just now concerning itself with the erection of a large godown at Nakuru and the arranging of facilities for the economical handling of the crop from farm to wharf and from wharf to ship.

**EARLY  
EFFORTS.**

Probably the first attempt to market maize on a co-operative basis was made in 1915 by the farmers in the Solai Valley, who arranged to sell their crops through a local firm, which did all the handling at a low percentage. This arrangement was successful, but in the following year the Association now under review was formed, and its officials took over the business.

**A SOLID  
BASIS OF  
FINANCE.**

The Association has done its work effectively, and 93 per cent. of the maize growers within the immediate sphere of its operations have now become members. An entrance fee of fifteen rupees is paid by each member. Capital is raised by a tax of thirty-seven cents (sixpence) on each bag of maize supplied during the first year, and on any number of bags supplied in any subsequent year in excess of the number on which tax has already been paid. This tax stands to the credit of each member in the shape of capital subscribed. To establish a reserve fund in order to ensure the general prosperity of the Association, a tax of six cents (one penny) per bag is deducted from each crop. A certain percentage of the proceeds received from maize sold is retained by the Association until the end of the financial year, when all prices are pooled, each member receiving the same rate for equal quality maize.

**CO-OPERATIVE  
BUYING.**

Among the members privately a certain amount of co-operation in the buying of standard implements has taken place, the handling and ordering being done on a percentage basis by a local firm, who receive a bank guarantee with the order, and as this has resulted in a considerable saving there is a movement on foot to make the Association a purchasing one in the simplest sense, the purchasing being done through local firms as heretofore. The Association would ascertain the members' needs before placing an order, and the goods would be forwarded direct to each member's railway station.

There are certain commodities a farmer needs which he can order at any period of the year, such as sacks, sacking twine, ploughs, cultivators, harrows and so forth. All these could be obtained through local firms working on a small percentage of profit above landed cost, at no risk to the Association, and if delivered straight from the truck, at a minimum of expense.

ECONOMICAL  
BUYING.

Co-operation along these lines will not only result in an immediate financial saving, but will gradually lead to the standardisation of machinery and implements, with beneficial results to the community of a district as a whole. The new comer, unlike his less fortunate fellow of earlier days, will not foolishly spend a fortune in trying all sorts of fancy implements, but will be impressed by the aggregation of opinion in favour of certain makes as the most suited to local requirements, and be satisfied to follow example. The established settler will benefit by the labourers of the district having already had experience in the use of similar implements, and so be saved the necessity of having to educate them afresh.

BENEFITS OF  
CO-OPERATION.

The Association looks after the interests of maize growers generally, and when complaints or requests to the authorities have to be made they usually fall on sympathetic ears the result of the strength of co-operation successfully applied.

UNITY IS  
STRENGTH.

W. J. DAWSON.

## HOW I WOULD FARM 240 ACRES WITH NOT MORE THAN £700.

HAVING obtained my grant of 240 acres, and after carefully considering all crops, I would make an effort to get in 100 acres of maize the first year, with the intention of subsequently planting up with coffee at the rate of 20 acres or so each year. My reasons for selecting maize are that it is a crop which gives a quick and good return and does not want so much knowledge as wheat and flax for instance, in addition to which it requires less machinery.

MAIZE TO  
START WITH.

**GETTING TO  
WORK.**

Having ordered my ploughs and other implements, I would enter into active possession of my farm with my tools and a tent hired until such time as my house would be ready. My first action then would be to locate a site for boys' huts and the cattle boma. Whilst 20 boys were building the huts and boma I would select the area to first be put under the plough, and flag out 100 acres. The huts and boma finished, I would start the boys clearing bush and taking out stumps, and while they were so engaged would, during a visit round the district, arrange for transport for my ploughs, etc., and buy 24 serviceable oxen, so that when my ploughs arrived I would be ready to start. The boys having cleared some of the area to be cultivated, and my ploughs and oxen having arrived, I would at once start in ploughing, discing down with the harrow what had already been ploughed, so soon as the plough overtook the boys clearing, and so on until my hundred acres were ready. With 24 oxen I could work every day, changing my oxen so that eight were always resting. Working in this way, my plough should do about  $2\frac{1}{2}$  acres per day breaking land and about  $2\frac{3}{4}$  when cross ploughing.

**LABOUR  
REQUIRED.**

In my estimate of costs appended I have allowed for 20 boys working continuously for the first twelve months, but this would not really be necessary, as when the clearing and stumping had been finished, half that number might be dispensed with until the maize was ready to harvest.

**THE COFFEE-  
NURSERY.**

The 100 acres ploughed, cross ploughed and disc harrowed so as to secure a fine tilth, I would look out a site for my nursery, get it dug over, and plant my coffee seed, about thirty pounds of seed at a cost of about six shillings. Coffee beds should not be more than four feet wide, with an alley way between each to make weeding and watering easy. They should of course be located near the river, and be easy to get at.

**A SERVICE-  
ABLE HOUSE  
AT LOW COST.**

When the nursery was finished, I would take my 10 boys to where I had selected a site for my house, and on this question of a house I would like to make it clear that I do not consider that a man who has

only £700 capital should start in building stone mansions, when a really serviceable house can be built of sun dried bricks with a good thatched roof. No other style of house is cooler than this through the hot season. It is inexpensive and requires little skill to construct. Boys dig out earth, mix with water, and puddle it well until it is of the consistency of dough, when it should be built up between boards, not more than two feet high at a time. You can go right round the walls building them two feet high each day, and then leave them to dry until the following morning. The boards are shifted up day by day as the height of the walls increases, until the house is finished. A house of this description containing two rooms each twelve feet square can easily be built in a month at the cost of the labour and doors and windows.

The land being ready and the rains having PLANTING. broken, I would start my drag harrow to work leveling and fining down the soil. Giving my harrow two days start, I would get going with my planter sowing the maize, which should be 40 inches between rows and 12 inches in the row the first year. When the maize was high enough, which should be in about four weeks from planting, I would at once start my scufflers and keep them working until the maize was too high, which would be in about ten to twelve weeks after planting.

Now I must build my maize crib. In my estimate MAIZE CRIB. of costs I have reckoned £50 for the cost of this, but if I had serviceable timber on the farm and were at all handy I could construct it for half that sum. Allowing £25 for sawn timber for flooring and wire netting, a double crib, each bay 60 feet long by 9 feet wide by 6 feet high, will hold 1,400 bags of maize on the cob. This should be ample for my requirements. The first year I reckon on getting only 800 sacks, but each subsequent year I should get from 1,000 to 1,200, according to the season and my selection of seed. Having harvested and sold the maize, my first year with its troubles and worries is over.

The second year I would stake out 20 acres to be PLANTING UP planted with coffee, breaking up an additional 20 THE COFFEE. acres for maize, so as to maintain 100 acres continu-

acres for maize, so as to maintain 100 acres continuously under that crop. Between each row of coffee for one year I would plant beans, using my planter for this, so as to have a double row of beans between each row of coffee. Coffee should be planted 9 feet by 6. In my second year then I would have 100 acres of maize and 20 acres of coffee and beans.

**A SIX YEARS' PROGRAMME.**

Continuing to develop on these lines I should have in my third year:—100 acres of maize, 20 acres of 2 year old coffee, and 20 acres of one year old coffee and beans; in the fourth year:—100 acres of maize, 20 acres of 3 year old coffee giving a small crop, 20 acres of 2 year old, and 20 acres of one year old and beans; in the fifth year:—100 acres of maize, 20 acres of 4 year old coffee, which should give me about 4 tons of berries, 20 acres of 3 year old with a small crop, 20 acres of 2 year old, and 10 acres of 1 year old coffee and beans; and in the sixth year:—100 acres of maize, 20 acres of 5 years old coffee giving 7 tons, 20 acres of 4 year old yielding 4 tons, 20 acres of 3 year old with a small crop, and 10 acres of 2 year old. And so on each year. The area under maize should be steadily maintained, as with the increasing demands for labour food supply larger quantities are required for use on the farm, while the surplus can always be sold.

**THE POSITION AFTER SIX YEARS.**

From the foregoing it will be seen that of the original £700 only slightly over £500 is actually disbursed, and that at the end of the sixth year I would be £1,226 16s. od. better off in hard cash than when I started, in addition to which, of course, I would have a very much more valuable property. No allowance has been made for the cost of living, which on an economically managed farm should not be great, and should be more than covered by the unexpended balance of capital and the proceeds of sale of third years' pickings of coffee, which I have not included in revenue.

J. BROWNE.

# FIRST YEAR.

EXPENDITURE		REVENUE										
		£	s.	d.		£	s.	d.				
1	Three furrow Disc Plough	...	20	0	0	By 800 Sacks of Maize at 8/-	...	320	0	0		
1	Drag Harrow	...	6	0	0							
1	Disc	...	20	0	0							
1	Maize Planter	...	16	0	0							
1	Maize Sheller	...	12	0	0							
2	Scufflers	...	5	0	0							
12	Yokes	...	3	0	0							
12	Trek Chains	...	6	0	0							
20	Mattocks	...	4	0	0							
12	Jembis	...	2	0	0							
6	Axes	...	1	4	0							
6	Pangas	...	1	0	0							
	Odd Tools	...	4	0	0							
	Whips, reins, straps etc.	...	4	0	0							
24	Oxen at £6 each	...	144	0	0							
20	Boys at 12s., including food, per month, for 1 year	...	144	0	0							
1	Waggon	...	50	0	0							
	Timber, wire etc. for shoes	...	50	0	0							
	30lb. Coffee Seed	...	...	6	0							
10	Sacks Maize Seed	...	6	0	0							
	Grease, oils etc.	...	...	10	0							
	Repairs	...	9	0	0							
			508	0	0							
										320	0	0

## SECOND YEAR.

EXPENDITURE.	REVENUE.		
	£	s.	d.
20 Boys' Wages and Food	144	0	0
Coffee Seed	...	...	...
Bean "	5	0	0
Wear and Tear on Implements and Renewals.	40	0	0
	189	6	0
	430	0	0

## THIRD YEAR.

EXPENDITURE.	REVENUE.		
	£	s.	d.
25 Boys' Wages and Food	180	0	0
Coffee Seed	...	...	...
2 Extra Scufflers	5	0	0
Wear and Tear on Implements and Renewals	40	0	0
	225	6	0
	430	0	0



### FOURTH YEAR.

EXPENDITURE.			REVENUE.		
	£	s.	d.		
30 Boys' Wages and Food	216	0	0	1,000 Sacks of Maize at 8/-	...
Coffee Seed	...	6	0	50 " " Beans at 12/-	...
Wear and Tear on Implements and Renewals	40	0	0		
	256	6	0		
					£ s. d.
					100 0 0
					30 0 0
					130 0 0

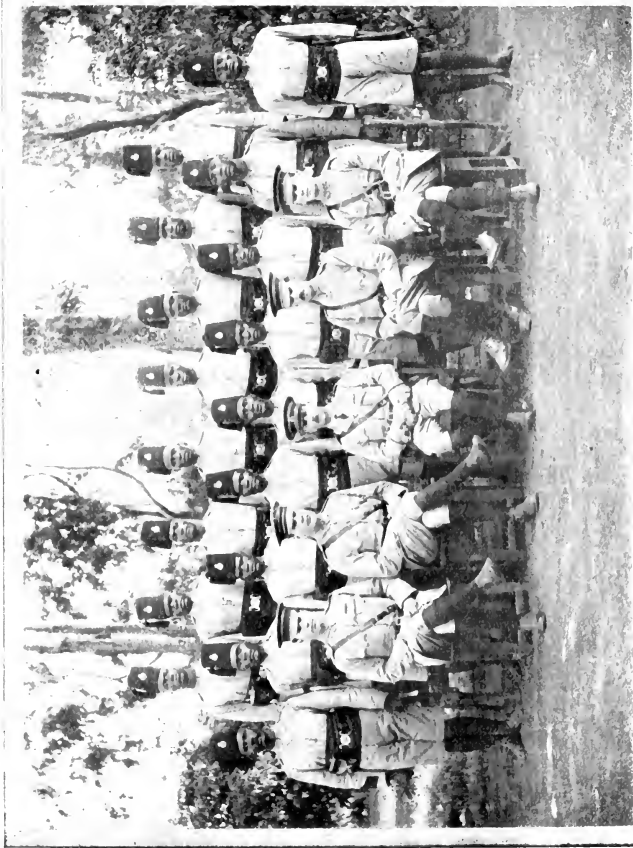
### FIFTH YEAR.

EXPENDITURE			REVENUE.		
	£	s.	d.		
30 Boys' Wages and Food	216	0	0	1,000 Sacks of Maize at 8/-	...
Coffee Seed	...	6	0	50 " " Beans at 12/-	...
Renewals etc.	40	0	0	1 Tons of Coffee at £50	...
Coffee Pulper	30	0	0		
Tanks for Fermenting	10	0	0		
Buildings and Trays	30	0	0		
	326	6	0		
					£ s. d.
					100 0 0
					30 0 0
					200 0 0
					630 0 0

## SIXTH YEAR.

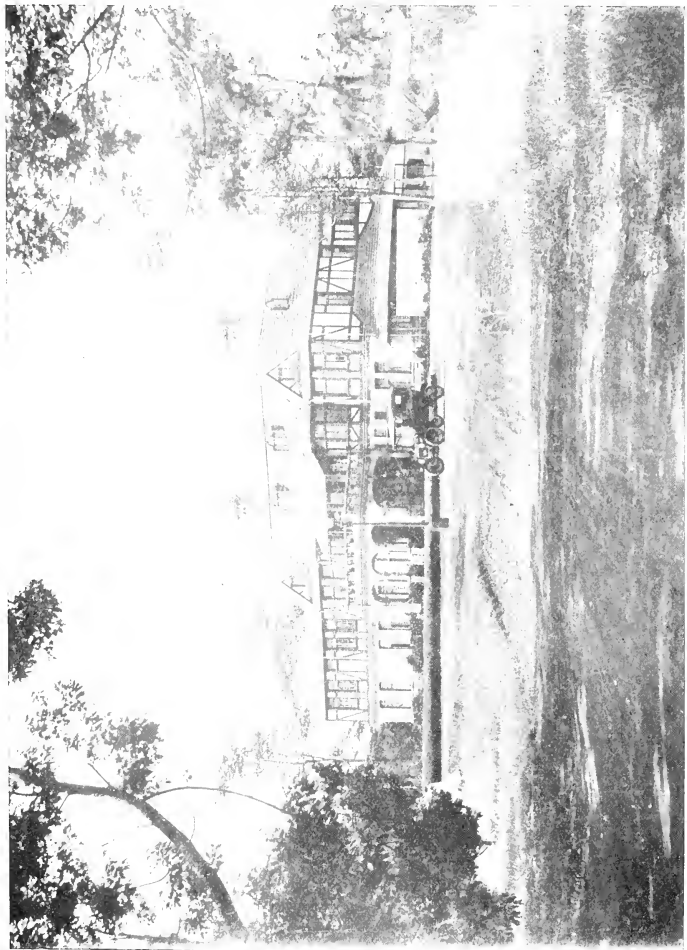
EXPENDITURE.		REVENUE				
	£	s.	d.	£	s.	d.
40 Boys' Wages and Food	288	0	0	1,000 Sacks of Maize at 8/-	...	...
Renewals	40	0	0	50 " Beans at 12/-	...	...
Local Dryer	100	0	0	11 Tons of Coffee at £50	...	...
Buildings	50	0	0			
	478	0	0			
					980	0 0

J. BROWNE.



*Photo by H. D. Young.*

**NAIROBI POLICE, 1917.**



*Photo by W. D. Young.*

**GOVERNMENT HOUSE, NAIROBI.**

## THE PRINCIPAL COMMERCIAL CENTRES.

### KILINDINI AND MOMBASA.

The principal port of British East Africa, Kilindini—said to be the finest harbour on the East Coast—is situated on the west side of Mombasa Island, Mombasa harbour being on the north-east side. It is connected with the town of Mombasa by a light tramway in addition to the Uganda Railway. A large grant has been made by the Imperial Government for extensive harbour works at Kilindini to provide for the rapidly increasing trade of the hinterland, and when these are completed shipping facilities will be greatly improved. In addition to being the headquarters of shipping and forwarding agents, Mombasa possesses several well-equipped stores, hospitals, schools, hotels, churches, clubs and banks.

The European population is between three and four hundred. Though tropical, the climate of Mombasa is comparatively healthy. Except in the hot season, from November to February, travellers to the Highlands thoroughly enjoy a break of a few days at the Coast, exploring the oriental wonders of the old town and visiting points of interest on the Island. Excellent fish is obtainable at Mombasa, and supplies are regularly sent to Nairobi and other stations up the line, packed in ice.

### NAIROBI.

The administrative and commercial capital of British East Africa is situated at an altitude of 5,450 ft. about mid-distant between Mombasa and Kisumu, the distance from the coast by rail being 327 miles. The rapid development of Nairobi epitomises the progress of European settlement in the Highlands. In the course of a decade it has expanded from little more than a collection of tin shanties into a progressive commercial centre possessing most of the advantages of older towns:—electric light, telephone service, pipe borne water supply, banks, spacious hotels, daily and weekly newspapers, theatres, schools, branches of the Y.W.C.A., and Y.M.C.A., wide, well laid-out thoroughfares and so forth. The commercial area boasts of many substantial buildings,

while many of the handsome residences in the suburbs of Muthaiga, Parklands and the Hill are testimony to the growing prosperity of the district.

The European population of Nairobi and the surrounding district is estimated at about 2,000. Sports and recreation are well provided for by numerous clubs and associations. The Nairobi Club—founded in the early days by officers and civil servants of the Government—with its affiliated Gymkhana Club, possesses spacious premises on the Hill and 14 acres of grounds laid out for polo, hockey, cricket, football and tennis, with a golf course adjoining. The social life and recreation of Parklands and Muthaiga residential districts are also well provided for by their respective clubs.

The government of the town is in the hands of a Municipal Committee, composed of heads of Government Departments and elected representatives of the people. A feature of Nairobi life is the large number of motor cars and cycles privately owned and plying for hire: rickshaws drawn by natives take the place of a tramway service. Nairobi is well provided with first-class hotels and boarding houses. The health of the community is well looked after by several private doctors, the European Hospital and Scott Sanatorium provide accommodation for the sick and convalescent, in addition to which there are several nursing and maternity homes.

#### NAIVASHA.

Situate 391 miles from the Coast, at an altitude of 6,230 feet, Naivasha is to-day of less importance as a commercial centre than as a health and pleasure resort. Its truly delightful scenery and bracing climate constitute it an ideal place for a holiday or rest, while the excellent bird shooting is an added attraction. The Rift Valley Hotel stands on a commanding position over-looking the Lake and surrounding country, while a more modern building—the Naivasha Hotel—has been erected close to the shores. Naivasha is the heart of a vast area of first class grazing country, most of the farms in the neighbourhood being heavily stocked with high grade cattle and sheep. Stock auctions are held at frequent intervals. The stockyards of Newland, Tarlton & Co.,

Ltd. are situate on the outskirts of the township. Six miles away is the Government Stock Farm.

### NAKURU.

**T**HE important township of Nakuru, overlooking the Lake of that name, is situate on the Uganda Railway 447 miles from the Coast, at an altitude of 6,000 feet. Unlike Nairobi, which stands on the fringe of the Highland Zone, Nakuru is in the heart of the Highlands. If the town be taken as the centre of a circle having a radius of 120 miles, it will be seen that practically the whole of the Highlands are comprised in its sweep. The town is well situated amidst lovely surroundings, and possesses all the natural advantages of a large commercial centre.

Nakuru is the livestock centre of East Africa, and its annual Show, held under the auspices of the Pastoralists' Association, is the premier Agricultural Show of the Protectorate. The spacious Stock Yards of Newland, Tarlton & Co., Ltd., are situated on the outskirts. The B.E.A. Maize Growers' Association has its headquarters in the town, the Lower Molo and Solai districts being at present the principal maize growing centres.

The town to-day has a post-office, two banks, a school, hotel, club, an engineering shop and garage, and several good stores. When the Nakuru-Mumias Railway and the main road to the vast Laikipia stock country are constructed, the rapid development of Nakuru will be assured.

### LONDIANI.

Situate 51 miles from Nakuru and 84 miles from Kisumu, at an altitude of 7,410 feet, Londiani is the present gateway to the Eldama Ravine and Uasin Gishu districts. It possesses several European stores, a small hotel, and the third of Newland, Tarlton & Co's. up-country stockyards. Stock sales are held at intervals.

### KISUMU.

Kisumu (formerly known as Port Florence) is the Victoria Nyanza terminus of the Uganda Railway and

the port of embarkation for Uganda, distant 584 miles from the Coast, and situate at an altitude of 3,660 feet above sea level. Here are situated the dry dock and construction and repair slip of the Lake steamer service, cotton ginneries, Customs Department, and clearing and forwarding houses. A trade in fresh fish is done with stations on the Uganda Railway as far down as Nairobi.

### ELDORET.

Eldoret is the leading centre of trade on the Uasin Gishu Plateau. It is connected with Londiani on the Uganda Railway, 67 miles distant, by a very indifferent road. It possesses a hotel, several good stores, a branch of the Standard Bank of South Africa, Ltd., a post and telegraph office, Government school and official buildings. Eldoret will be an important station on the Nakuru-Mumias Railway when constructed, and even to-day is a township of some importance. A creamery has recently been erected, there are several flax mills in the vicinity, and it is a collecting and distributing depot for the incoming and out-going trade of the Plateau.



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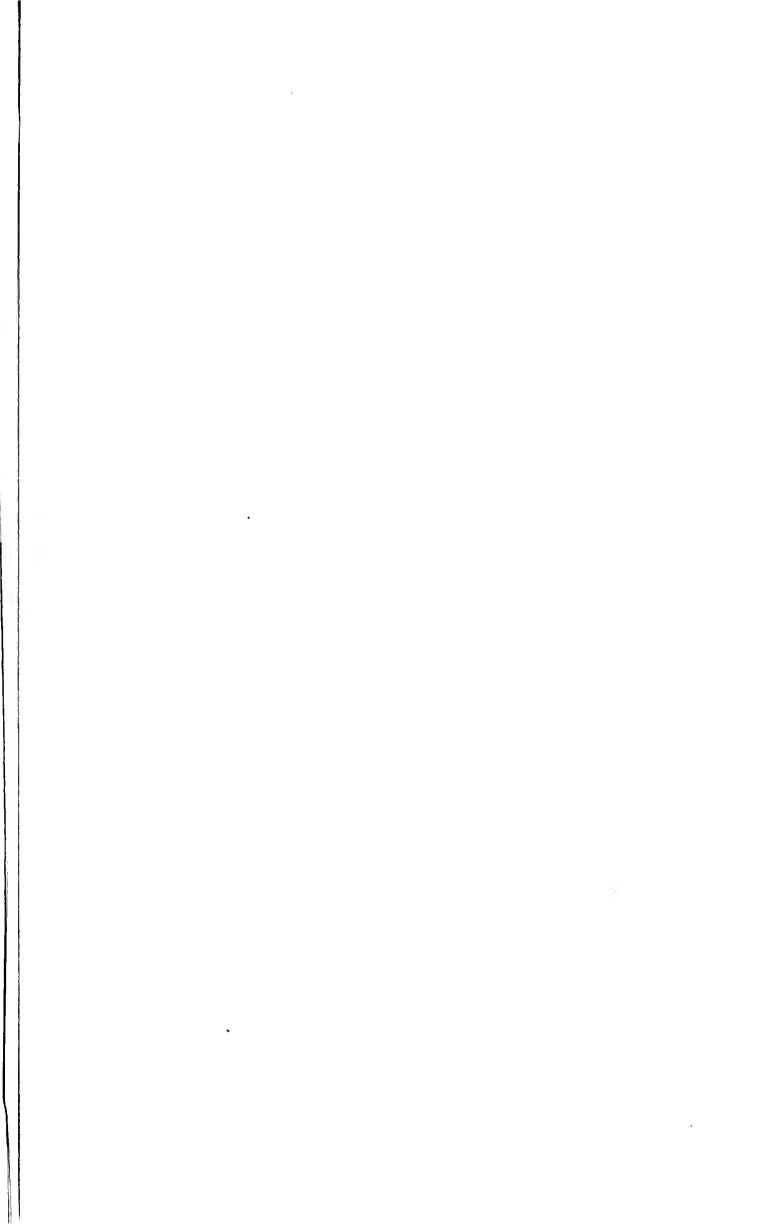
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